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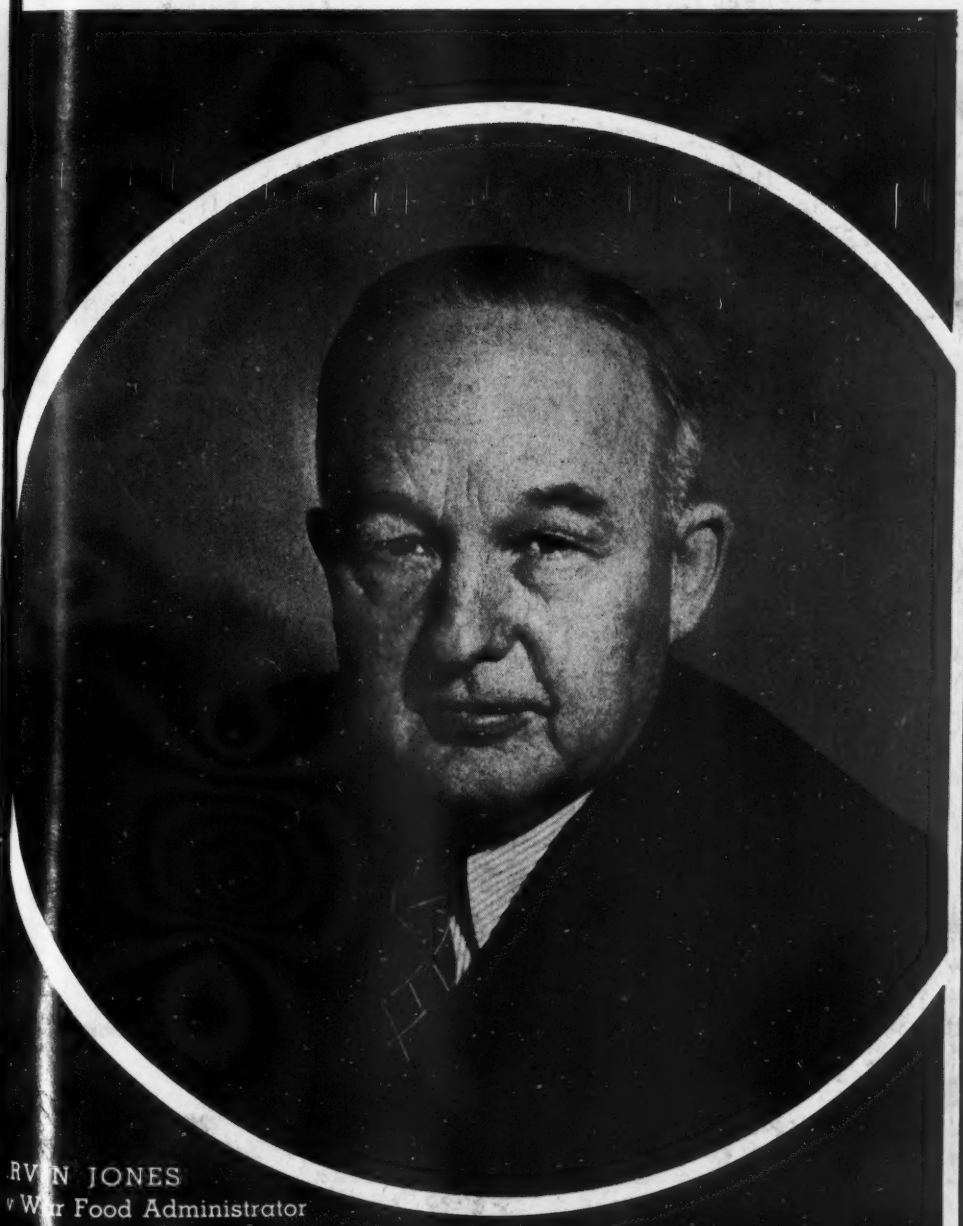

...RVIN JONES
...r War Food Administrator

AUGUST 1943

Interpreting the Food Conference

Costs of Vegetable Dehydration

Dehydrating Citrus Juices—Two Ways

Caps Reconditioned For Reuse on Beer

Flowsheets for Peanut Products

Beating Bacteria In Dry Milk Plant

U.S. Production Of Oil of Sage

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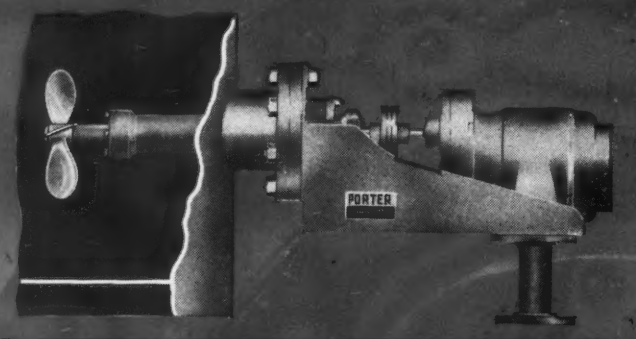

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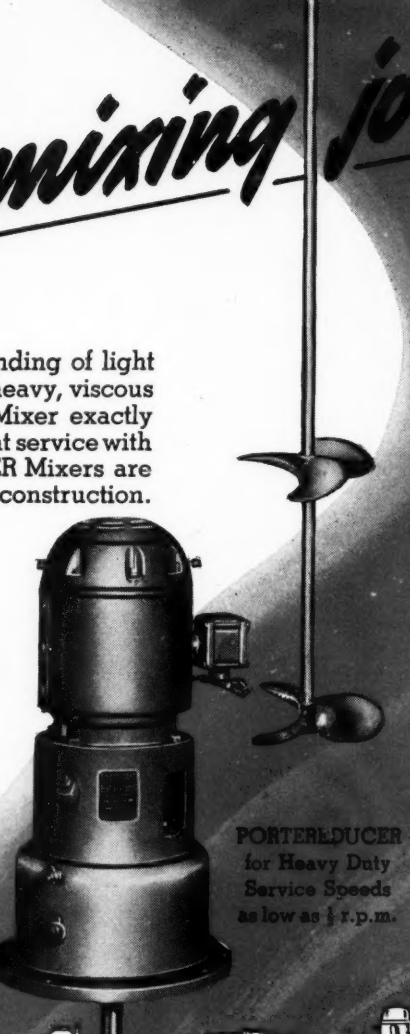

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AUGUST FOOD TECHNOLOGY

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THE COVER

War Food Administrator No. 3, Marvin Jones, is the gentleman on the cover. He took the oath of office on June 29, succeeding Chester Davis, who resigned. In a statement when he took the job, Judge Jones cited several things that are needed to improve the food situation, including farm machinery and repairs, farm labor, seed, feed, fertilizer and credits for farmers, and assurance to the farmer of a fair return for his production.

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Part of a well-known wine cellar was razed by fire recently. Almost everything in the burned buildings was destroyed beyond salvage or recognition. But shown above is a section of PYREX brand glass piping picked out of the ruins. It was bent by the heat. One end was chipped when it crashed. It is of no earthly use today, yet it is still clearly a piece of Pyrex piping! By contrast, the tiny flecks visible on its surface are splashes of molten aluminum.

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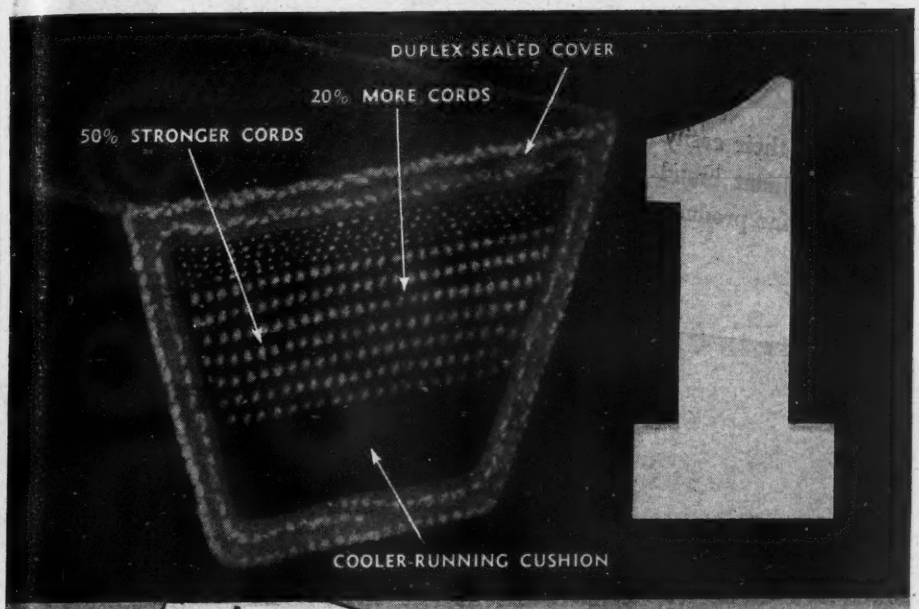

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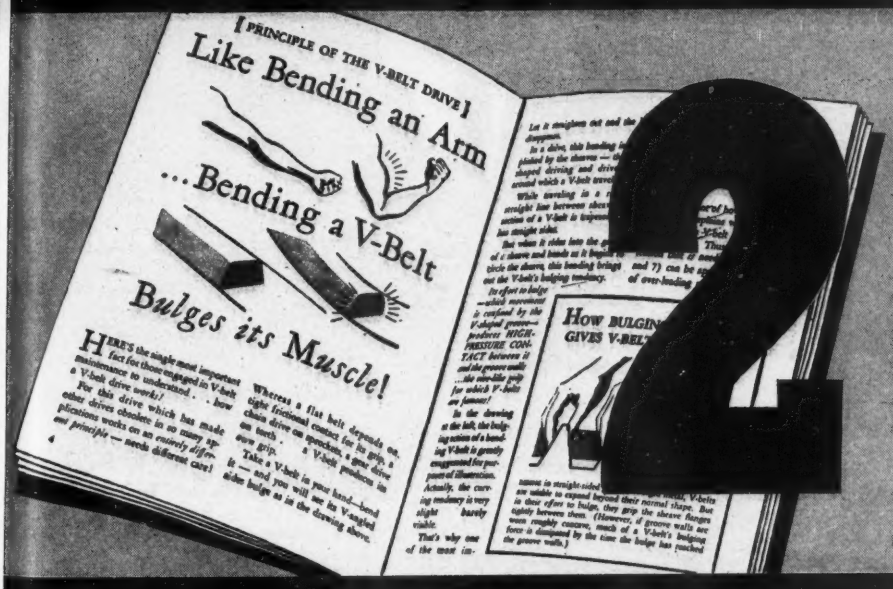

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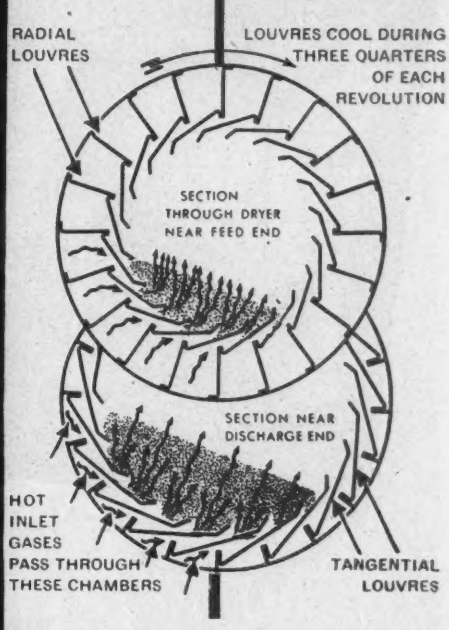
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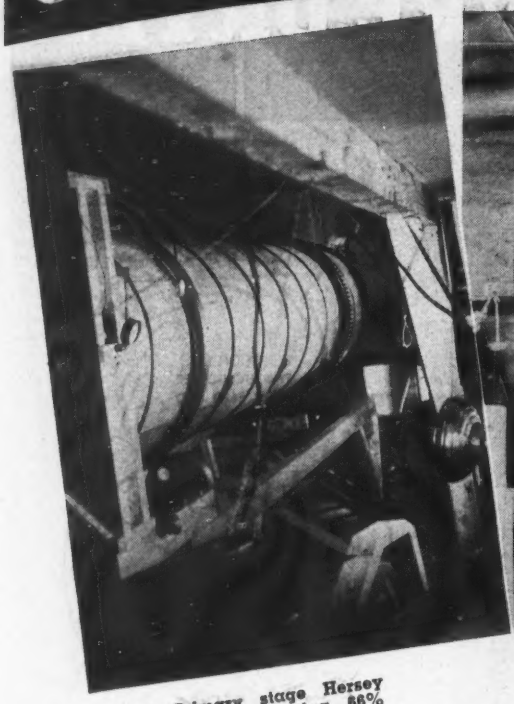
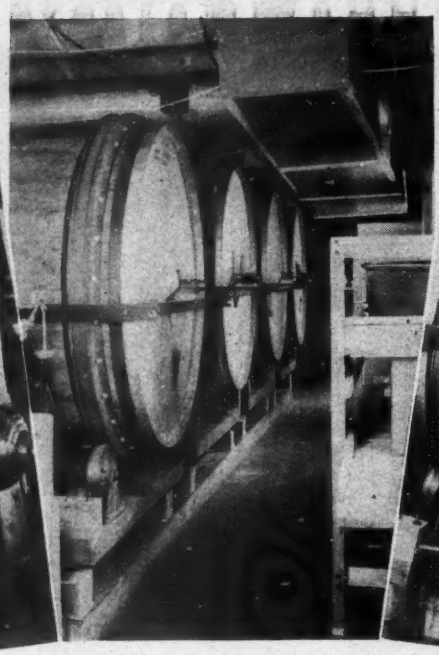


(a) Primary stage Hersey Dehydrator removing 66% of the moisture.



(b) Four finishing stage Hersey Dehydrator.

(c) Dried potatoes being discharged from a finishing stage Dehydrator.

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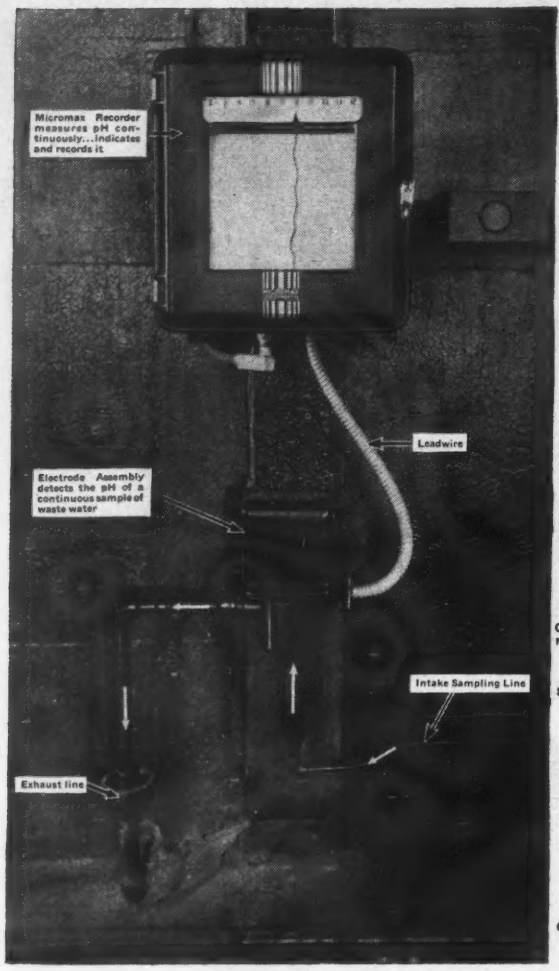
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Electrode Assembly detects the pH of a continuous sample of waste water
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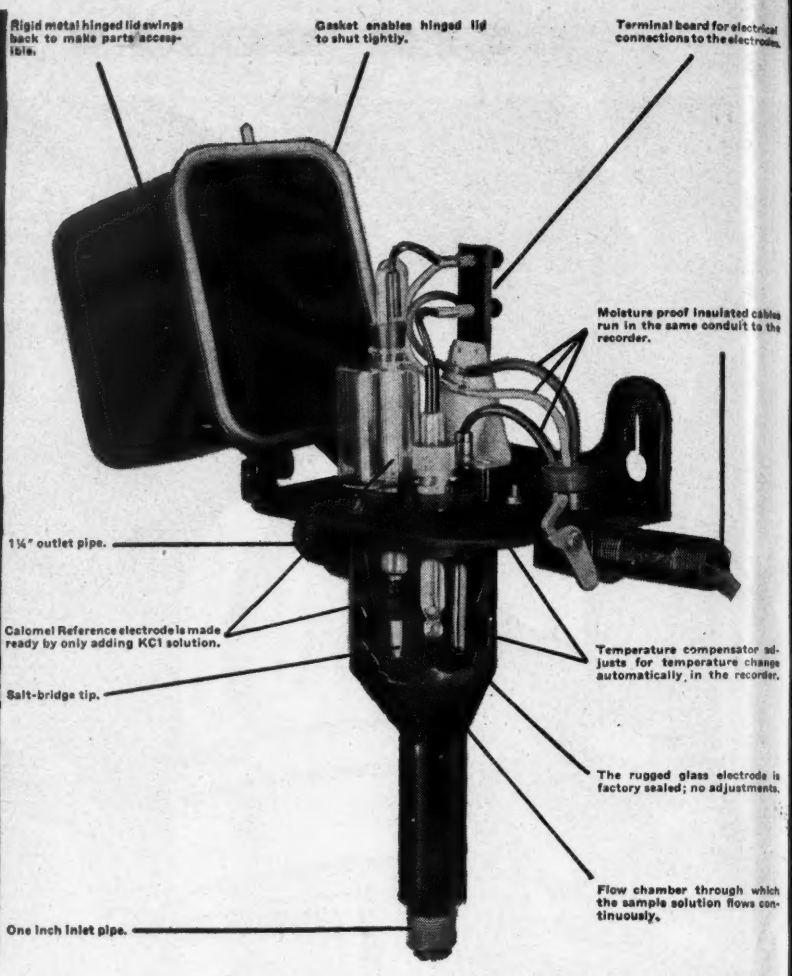
Rigid metal hinged lid swings back to make parts accessible.
Gasket enables hinged lid to shut tightly.
Terminal board for electrical connections to the electrodes.
Moisture proof insulated cables run in the same conduit to the recorder.
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Calomel Reference electrode is made ready by only adding KCl solution.
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Temperature compensator adjusts for temperature change automatically in the recorder.
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Jrl Ad N-96(3)

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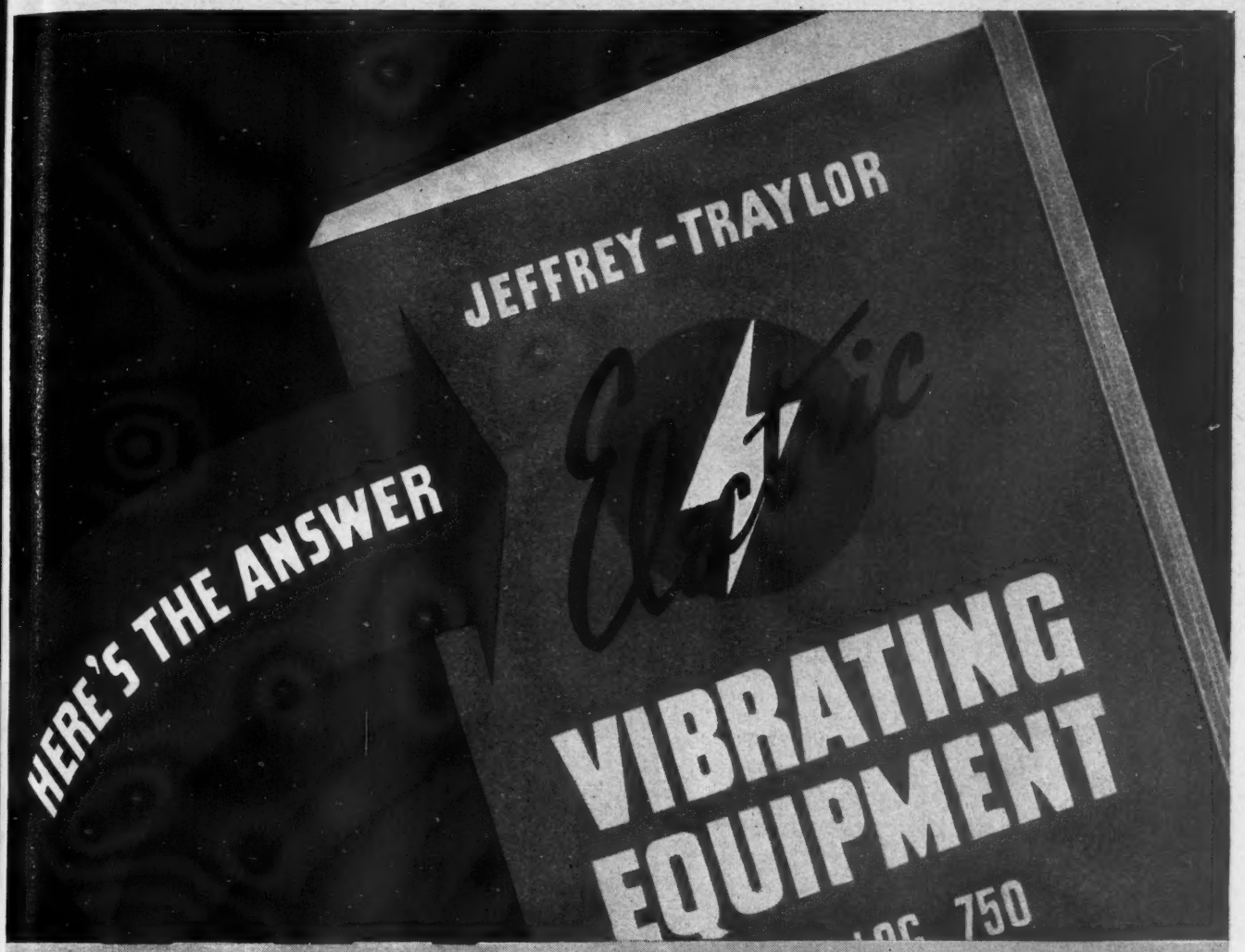

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Let G.E. Advise You on M

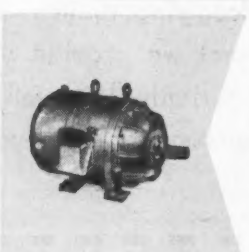
G-E STANDARD TRI/CLAD MOTOR

On pumps, blowers, sifters, packaging machinery, meets most drive requirements of spray-drying plants. Smooth contours are easy to keep clean. No openings in upper portion.

G-E SPLASHPROOF TRI/CLAD MOTOR

For sanitary milk pumps and other jobs where exposed to steam and wash water. Eliminates the need for protective canopies. Protected against dampness inside and out.

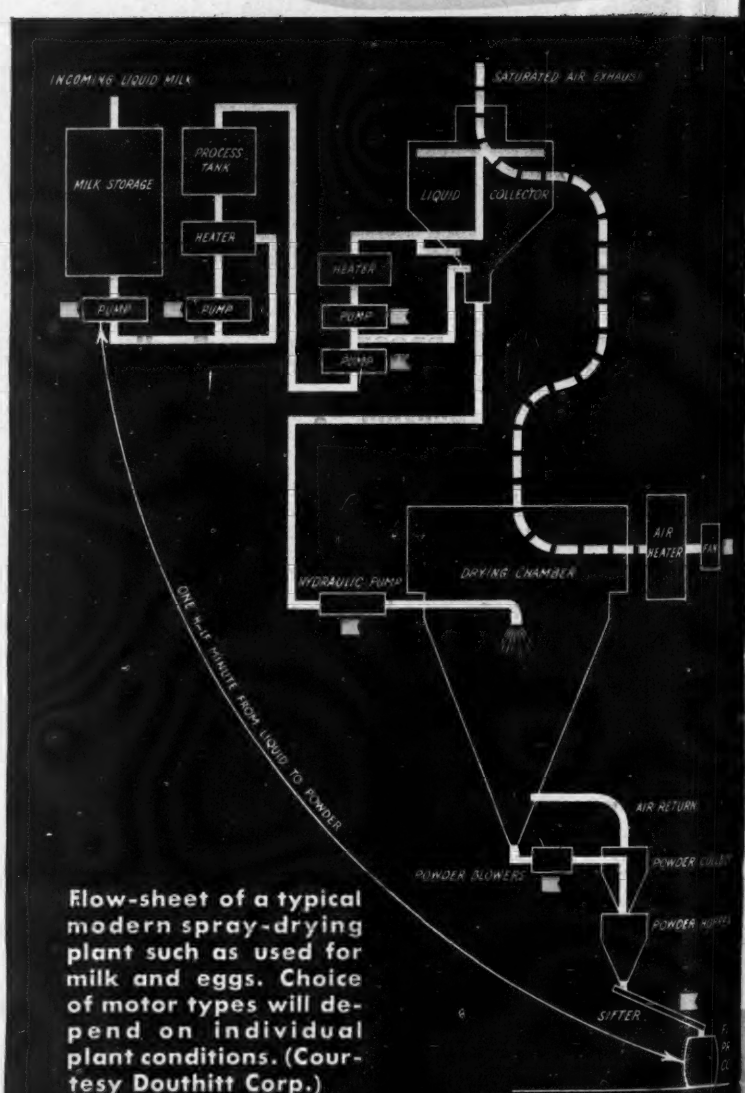
G-E DUST-TIGHT MOTOR



Totally enclosed for maximum safety and cleanliness. Among motors of this type are those listed as explosion-proof by Underwriters' Laboratories for Class II, Group G, conditions (grain dust, etc.).

G-E COMBINATION MOTOR STARTERS

A highly popular control unit that combines motor-circuit switch and magnetic starter in one compact unit. Available in standard enclosures to meet food-plant needs — watertight, dust-tight, etc., as well as in general-purpose enclosures.



Flow-sheet of a typical modern spray-drying plant such as used for milk and eggs. Choice of motor types will depend on individual plant conditions. (Courtesy Douthitt Corp.)

SPRAY DRYING

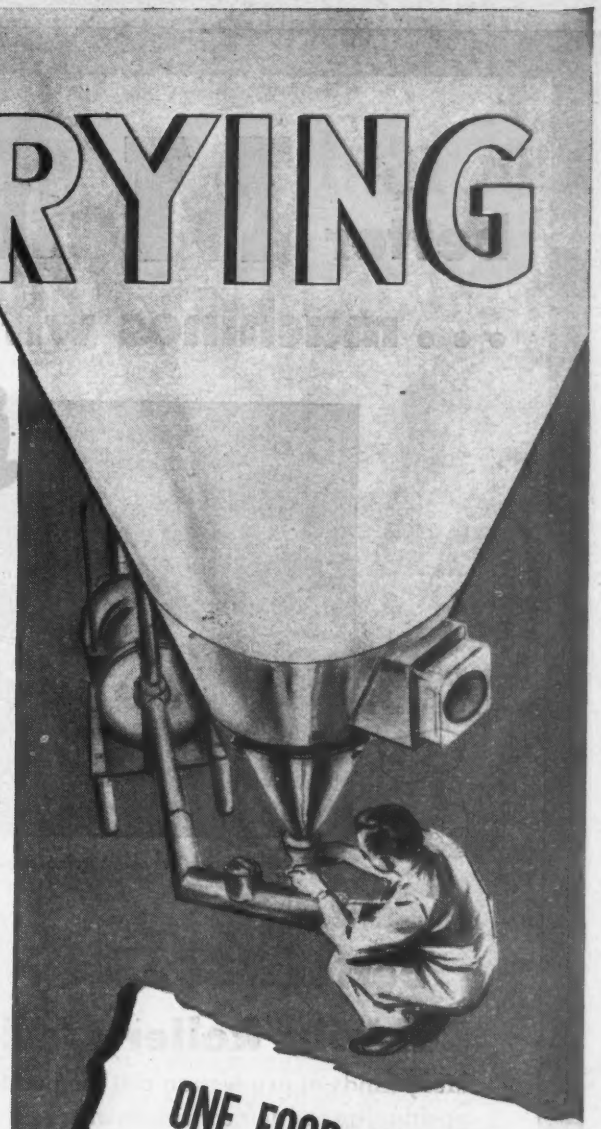
on Motors and Control

30 SECONDS FROM LIQUID TO POWDER— that's the pace of the modern spray-drying process. Yet in that half minute, a single unit may dehydrate 25 or more quarts of milk or 10 dozen eggs. Pressures as high as 5000 lb per sq in. keep fluids flowing fast through the spray nozzle. From start to finish, electric motors driving a succession of pumps and blowers must keep going, or the entire process comes to a halt. And a shutdown may necessitate a time-consuming "clean-up."

Some of these motors may be exposed to steam or wash water. Others may be required to operate in high temperatures, or in locations where enclosure against dust is essential. Control equipment, too, must be applied for 100 per cent operating continuity, often under unfavorable surroundings.

Whatever the conditions—in spray drying, drum drying, or pan drying—it will pay you to check your plans with G-E engineers. They can help you select motors, control, and other electric equipment that are not only right for the individual spot, but also right as a part of the over-all setup. Thus, you get a well-balanced combination of equipment that must "tie-in" together in service—an *integrated* electrical system that is easier to install, easier to maintain, and more likely to deliver full-scale output 100 per cent of the time.

For help on the electrical side of *any* essential food processing job, just call your local G-E representative. *General Electric, Schenectady, N. Y.*



ONE FOOD SHIP DOES WORK OF FIVE

Huge Shipments of Milk and Eggs Move to War Fronts in Powdered Form

Making a vitally important contribution to the shipping problem, America's capacity for drying milk and eggs is now being boosted to new high levels.

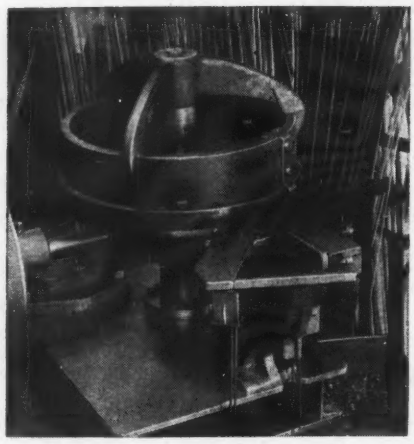
By the end of 1943, egg drying will be at the rate of 400,000,000 lb per year—more than six times the 1940 level. Dried-milk production has more than doubled, and an increasing proportion is spray-dried whole milk which can be reconstituted into beverage form for our troops and allies.

In the production of spray-dried products, all the important nutrients present in the fresh food are retained.

GENERAL ELECTRIC

663-9-110

better Methods
. . . machines with a sense of touch



A link stringing machine which feels beveled edges to position links correctly.

The equivalent of the senses of sight, hearing and touch have been duplicated mechanically by machine designers, with a vast saving of human effort and equally important product improvement. The urge of Baldwin-Duckworth engineers to "make better things" inspired them to design this machine with a sense of touch. It sorts and strings links to be fed into automatic assembly machines—literally feels the beveled edges of the links and places them in correct position on wire magazines. It safeguards this part of the assembly against any possibility of error.

better Drives with Baldwin Roller Chain Belts

Many kinds of production call for precise mechanical positioning and deft, continuous mechanical operations. Here, as in most other instances, the drive for the machine is best handled by roller chain belt. *Baldwin Roller Chain Belts, by reason of their precise manufacture, unfailingly give maximum accuracy in split-second timing, smooth and jerk-free operation, virtually 100% efficiency and total absorption of loading shocks.* It has been established that chain belts are the only medium of power transmission that can absorb shockloading without loss of speed ratios or efficiency.

The Baldwin-Duckworth catalog is a storehouse of information on roller chain belts. But a Baldwin man can serve you personally on matters having to do with the drive for machines which you may be designing or adapting. Call him—he will be glad to help you.

BALDWIN-DUCKWORTH Division of Chain Belt Company, 325 Plainfield Street, Springfield, Mass.

EXAMPLE

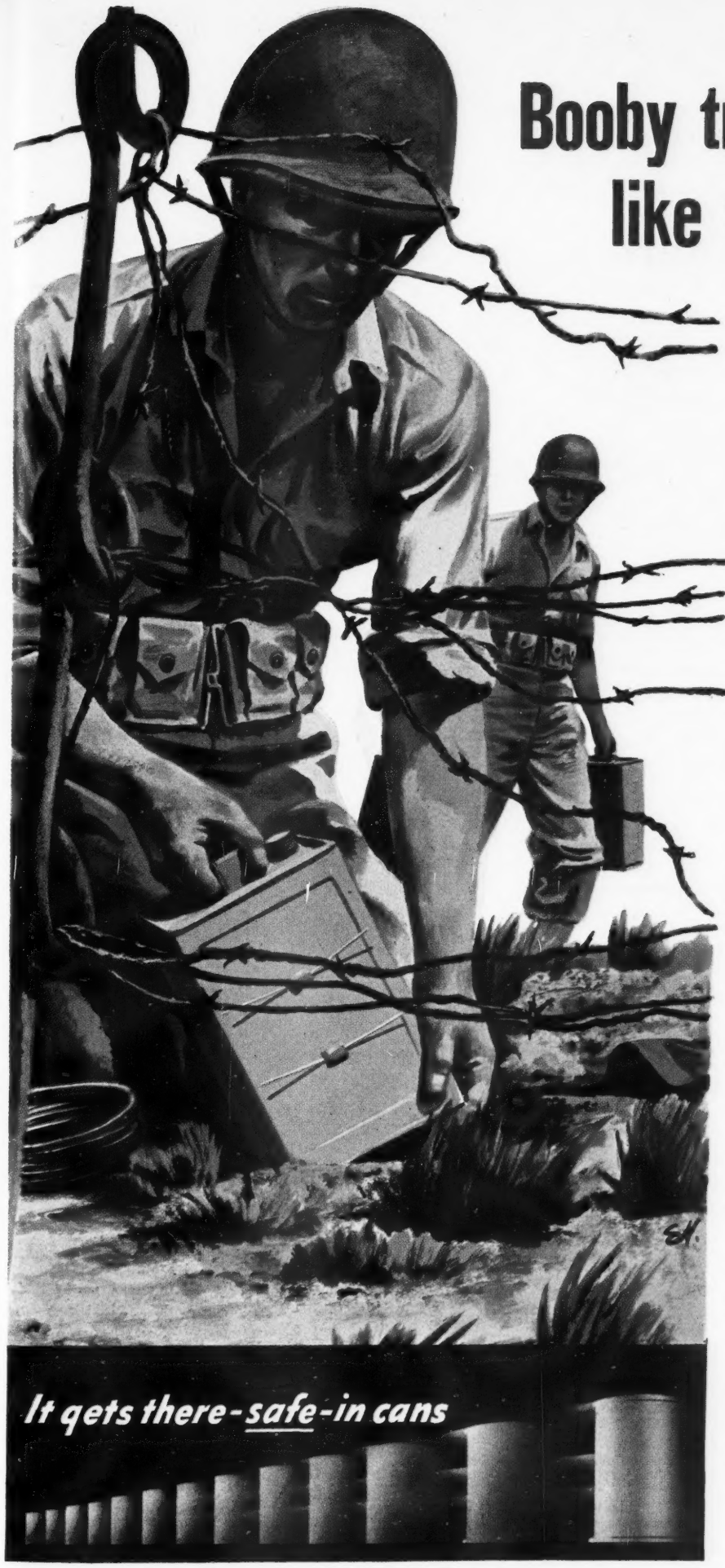
This labeling machine must handle a large volume of work without error and timing must be completely accurate. Baldwin Roller Chain Belts give:

1. **Split-second timing**
2. **Smooth, jerk-free operation**
3. **Virtually 100% efficiency**

IT'S BALDWIN-EQUIPPED

better Drives through better Methods

BALDWIN
ROLLER CHAIN BELTS



Booby traps that look like varnish cans!

Remember when you used to walk into a store and buy a gallon of varnish? The man handed you a can with a screw top and a handle.

Who'd have thought that this very same can would some day become a booby trap—a deadly land mine? It has!

The soldier in the picture is planting this booby trap. It's an anti-tank mine containing explosives that cripple a tank by wrecking its treads. Two wires run from inside the can to hidden trip wires that set off the explosion.

Do you wonder now why you can get only certain cans for civilian use? Cans have gone to war! There are good reasons why the can, more than any other container, is needed for war.

Cans are tough customers. They're impervious to heat, cold, moisture. Dirt, insects, gas and light can't get into them. They don't break, chip, tear. Things get there—*safe*—in cans!

The cans that are away helping American boys fight will be back some day. They'll be even better cans. We're gaining new and useful knowledge as "Packaging Headquarters for America" at war.

CONTINENTAL CAN COMPANY

HELP *CAN* THE AXIS—BUY WAR BONDS

GREAT NAMES in American Progress

ROBERT FULTON, BOAT BUILDER — On a fateful Friday in 1807, a skeptical crowd gathered at the foot of Cortlandt Street, New York. They came to watch "Fulton's Folly" attempt the "impossible" by traveling without sails from New York to Albany. Those who came to jeer stayed to cheer. "Crazy" Bob's puffing, snorting Clermont wheezed away from the jetty and grunted upstream against the wind at the miraculous speed of four miles an hour. On that day, Robert Fulton, well-nigh penniless dreamer, revolutionized the water-borne transportation of the world.

AMERICAN BLOWER

American Blower products have contributed much towards the progress of American industry — progress that today is making it possible for America's vital industries to outproduce the world. In the great public utilities, the steel industry, in the manufacture of petroleum products, chemicals, in food processing, mining, smelting and refining, in hospitals, schools, public buildings and homes, American Blower air handling equipment has kept pace with progress.

Utility Set

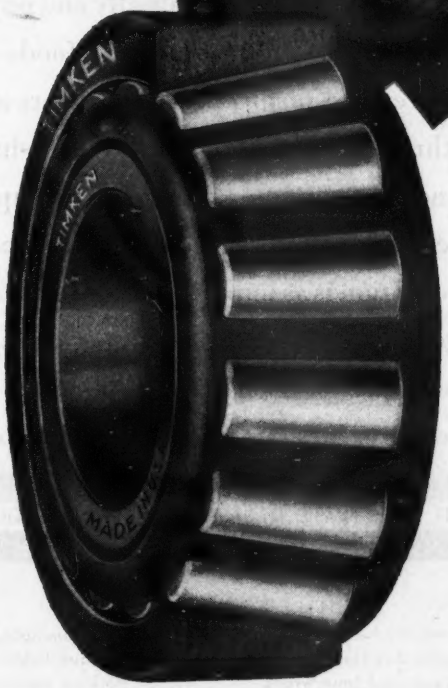
We're working 100% for victory. But you can still buy American Blower products for vital war work.

After victory we'll be ready with the most complete line of heating, ventilating and air handling equipment in history.

ARMY E NAVY
For excellence in production.

AMERICAN BLOWER CORPORATION, DETROIT, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of American Radiator and Standard Sanitary Corporation

When peace comes the lessons of destruction will be translated into machines for production with startling swiftness. What are your plans for the future? Even though you are busy with war orders today, are you planning to take full advantage of the latest scientific developments? Refinements in machine design invariably mean more Timken Bearings. True, a few Timken Bearings are better than none, but a fully Timken-equipped machine is both a better selling and better performing machine. Our engineering staff is available.



Tapered Roller
TIMKEN BEARING
EQUIPPED

A symbol of quality for any piece of equipment with which it is associated.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

AN AMERICAN INSTITUTION WORKING WITH AND FOR AMERIC

To the far-flung corners of the world home ties extend love and inspiration to America's sons in all branches of fighting, defense and production work. Spiritually and physically our kinfolk must be fed. Alert minds and bodies are fortified by health-building foods — foods that are as vital to victory as munitions. America's farms are food *factories*, its processors are food *arsenals*, its protective packaging insures safe *convoying* through "danger zones" of waste, shrinkage and contamination. The need for supplies to reach war fronts abroad and at home in good condition is as important as the arrival of the goods themselves. Here at packaging-paper headquarters every effort is directed to making invulnerable papers for that purpose.

RHINELANDER
PROTECTIVE PACKAGING
Papers

FROM THE BEST THAT'S MADE TO THE CHEAPEST THAT'S GOOD

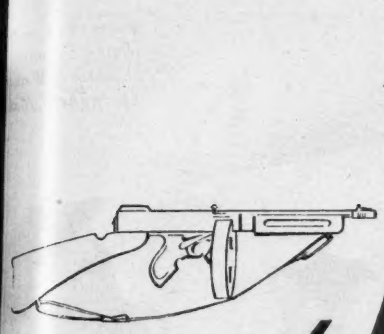
Genuine Greaseproof
Coffee Bag Papers
Confectionery Papers

Cereal Wrapping Papers
Laminated Greaseproof Papers
Lard and Shortening Liners

Bakery Product Wraps
Cracker Box Liners
Greaseproof Innerwraps

Wax Laminated Glassine
Opaque Label & Bag Glassin
Packing Industry Wrappings

RHINELANDER PAPER COMPANY • MILLS AT RHINELANDER, WISCONSIN, U.S.A



FROM THE *business* END OF THE "TOMMY" GUN...

...comes the research engineering skill to speed wartime manufacture and solve postwar production problems

GENERAL Electronic INDUSTRIES

A Division of Auto-Ordnance Corporation

GREENWICH • STAMFORD • BRIDGEPORT • NEW YORK

Our fighting forces needed Thompson Submachine Guns . . . *thousands . . . fast!* Auto-Ordnance Corporation has produced them *on time!*

The arsenal of freedom required tools of war production. Auto-Ordnance's Thompson Tool Division helped—is helping—to supply them!

The research engineering skill that has made good in the business of developing and producing guns, tools, vacuum tubes of both standard and special types, and other such weapons of Victory has achieved even greater, though secret, accomplishments in the fields of *Electronics, Hydraulics* and *Electromechanics!*

Many industrial leaders are already planning to "get the jump" on competitors after the war, with electronic devices to reduce production time, cut costs and improve precision manufacture. Perhaps we can make a notable contribution to *your* planning. *Write to Engineering Department, General Electronic Industries, 342 West Putnam Avenue, Greenwich, Connecticut.*

Army-Navy "E" awarded to Auto-Ordnance Corporation for excellence in production of "Tommy" Guns.

PRODUCTS MANUFACTURED INCLUDE ELECTRONIC CONTROLS · VACUUM TUBES HYDRAULIC SERVOS · ELECTROMECHANICAL DEVICES

Revolver parts shown by courtesy of Smith & Wesson, Springfield, Mass.

BIG PROTECTION
for small parts

Packaging vital Ordnance parts calls for tough, grease-and-waterproof containers like these rugged U. S. E. heat-sealed envelopes. These special-duty packages defy dust and water, keep protecting oils inside, and yet weigh but a fraction of an ounce.

You'll find U. S. E. containers guarding sulfa-drugs, sutures, salt tablets, toilet paper, field rations . . . Serving as packages for small parts, shipping papers, humidity indicators . . . providing boots for rifles, case liners for overseas shipments and moisture-vapor-water-grease-proof containers for many Ordnance materials.

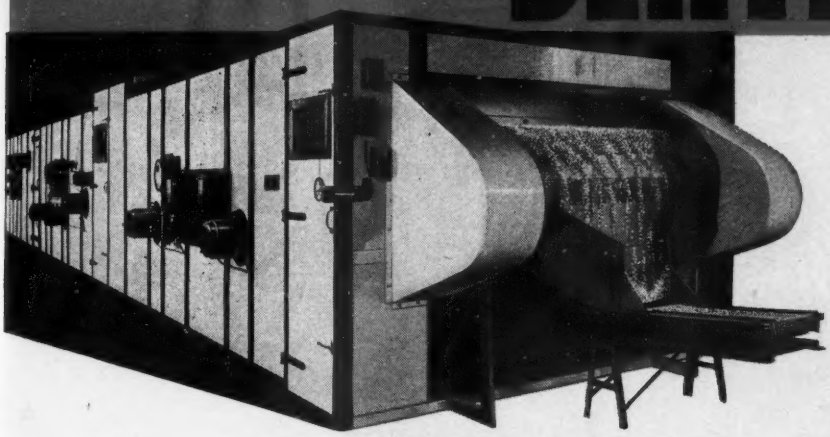
Built to Grade A standards from papers that pass requirements of Spec. AXS 840 R. 1. Write for samples and tell us your hard-to-solve protective packaging problems.

UNITED STATES ENVELOPE COMPANY
Container Division
SPRINGFIELD 2, MASSACHUSETTS

U·S·E *protective packaging*

Products of United States Envelope Company include: WAR PRODUCT PACKAGING • TRANSPARENT CONTAINERS • ENVELOPES WRITING PAPER • LINWEAVE PAPERS • NOTE BOOKS • PAPER CUPS • TOILET TISSUE • PAPER TOWELS

Continuous AND AUTOMATIC DEHYDRATION



PROCTOR *Continuous Conveyor* DEHYDRATOR

Shown above is a two-stage PROCTOR Continuous Conveyor Dehydrator as seen from the delivery end. The PROCTOR Dehydrator is available in two- or three-stage units to suit individual production requirements. The third stage of the three-stage machine is an automatic continuous conveyor finishing zone. With an increase of 75% in the floor space required, the three-stage machine gives 100% greater capacity than the two-stage dehydrator.

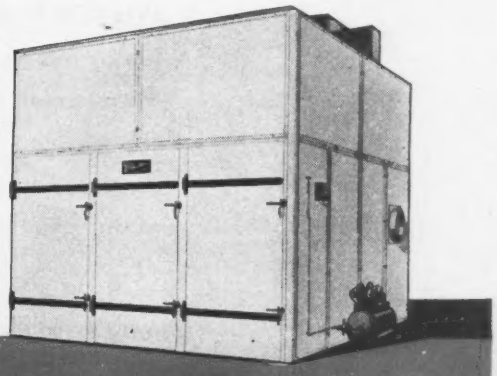
For perfect quality and maximum production, leaders in the food industry have found that *continuous operation* and *accurate control* are the keys to ideal food dehydration.

This entirely automatic machine includes a specially developed feeding device and drying enclosures through which the material is conveyed under controlled conditions of temperature and air circulation.

The PROCTOR Continuous Conveyor Dehydrator operates with a minimum of supervision, in a minimum of floor space. Its continuous operation and need for relatively little labor make this the ideal system where high production and low operating costs are prime requirements. Air-circulation up and down through the bed of vegetables on a travelling conveyor and accurate temperature control at every stage in the drying assure a uniform finished product. Full advantage of conveyor drying is made so that in moving from one stage to another the material is separated and rearranged to expose new surfaces for dehydration. PROCTOR Continuous Dehydrators are suitable for the quality drying of riced or diced potatoes; diced carrots; diced turnips; sweet potatoes; meats and other food products.

FOR SMALLER PRODUCTION REQUIREMENTS, PROCTOR TRUCK DRYERS

Where production requirements are somewhat lower, and time, labor and costs not such an urgent consideration the PROCTOR Truck-Tray system will adequately fill the need. This machine is equipped with temperature controls to insure accurate drying conditions; heating units are compact, efficient and trouble free. Heat loss from this machine is reduced to an absolute minimum through the use of highly effective insulated roof and wall panels. In design and build the entire machine conforms in every way to the highest PROCTOR standards.



A new 20-page booklet "The PROCTOR Continuous Conveyor Dehydrator" which tells in a series of pictures and captions, the complete story of continuous food dehydration, will be sent free on request to dehydrators and food processors interested in dehydration.

PROCTOR DEHYDRATORS

Manufactured by

PROCTOR & SCHWARTZ · INC · PHILADELPHIA

BOTTLES OF QUALITY AND CHARACTER

THIS IS OUR SPECIALTY

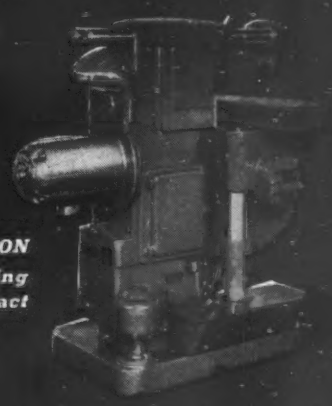
Illustrated above are catsup bottles by Foster-Forbes which are recommended for use by the War Production Board because of their simplicity of design and practicability.

Making quality bottles such as these has long been a FOSTER-FORBES specialty. We have designed and pioneered many other types of glass containers for commercial purposes as well. Our long and varied experience . . . high standards of production . . . and sincere, personal service are reflected in the character of our products and the satisfaction of our customers.

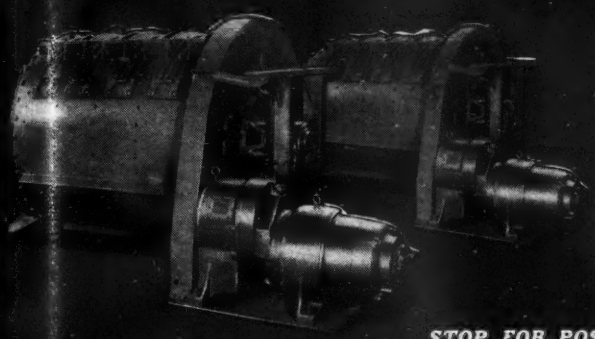
SALES REPRESENTATIVES: KANSAS CITY • DETROIT
CINCINNATI • CHICAGO • CLEVELAND • MILWAUKEE
ST. PAUL • ST. LOUIS • LOUISVILLE • ATLANTA
NEW YORK • MEMPHIS • HAVANA, CUBA

FOSTER·FORBES GLASS CO., MARION, INDIANA

BUY UNITED STATES WAR BONDS AND STAMPS



SPEED UP PRODUCTION
Save time by stopping quickly with a compact integral brake unit

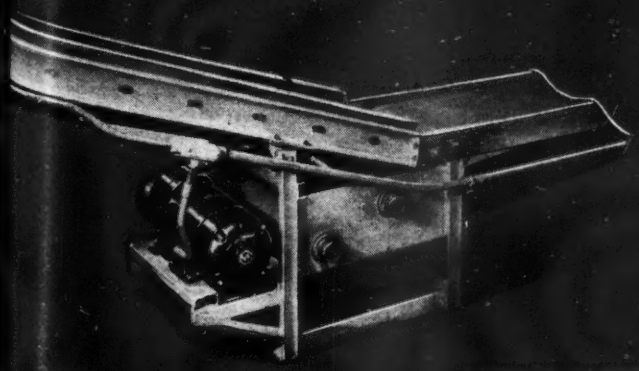


STOP FOR POSITION
Stop at the desired point for quickly and conveniently loading and unloading

MASTER UNIBRAKE MOTORS

1/10 TO 100 HORSEPOWER

THE MASTER ELECTRIC COMPANY • DAYTON, OHIO



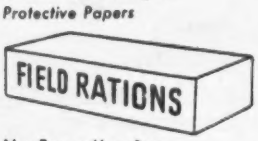
STOP AND HOLD ANY LOAD
Unibrake motors are very advantageous on hoists, elevators, inclined conveyors, etc. . . .

STOP FOR SAFETY
Reduce the hazard of injury to workmen or damage to equipment which might cripple vital production

FRESH FROM *Factory* TO *Fox Hole*

Riegel Paper Protects Cereals in Special "Eat-Right-Out-of-the-Box" Package

Dried Eggs and Many Other "Lend-Lease" Foods Use Riegel Protective Papers



New Papers Have Been Developed for Packaging of Field Rations

It used to be..."Fresh from Maker to Consumer." But today...with "consumers" scattered all over the globe; living and fighting under all sorts of conditions and climates . . . the problem of keeping food fresh is taxing the dexterity of packaging engineers as well as the output of packaging materials.

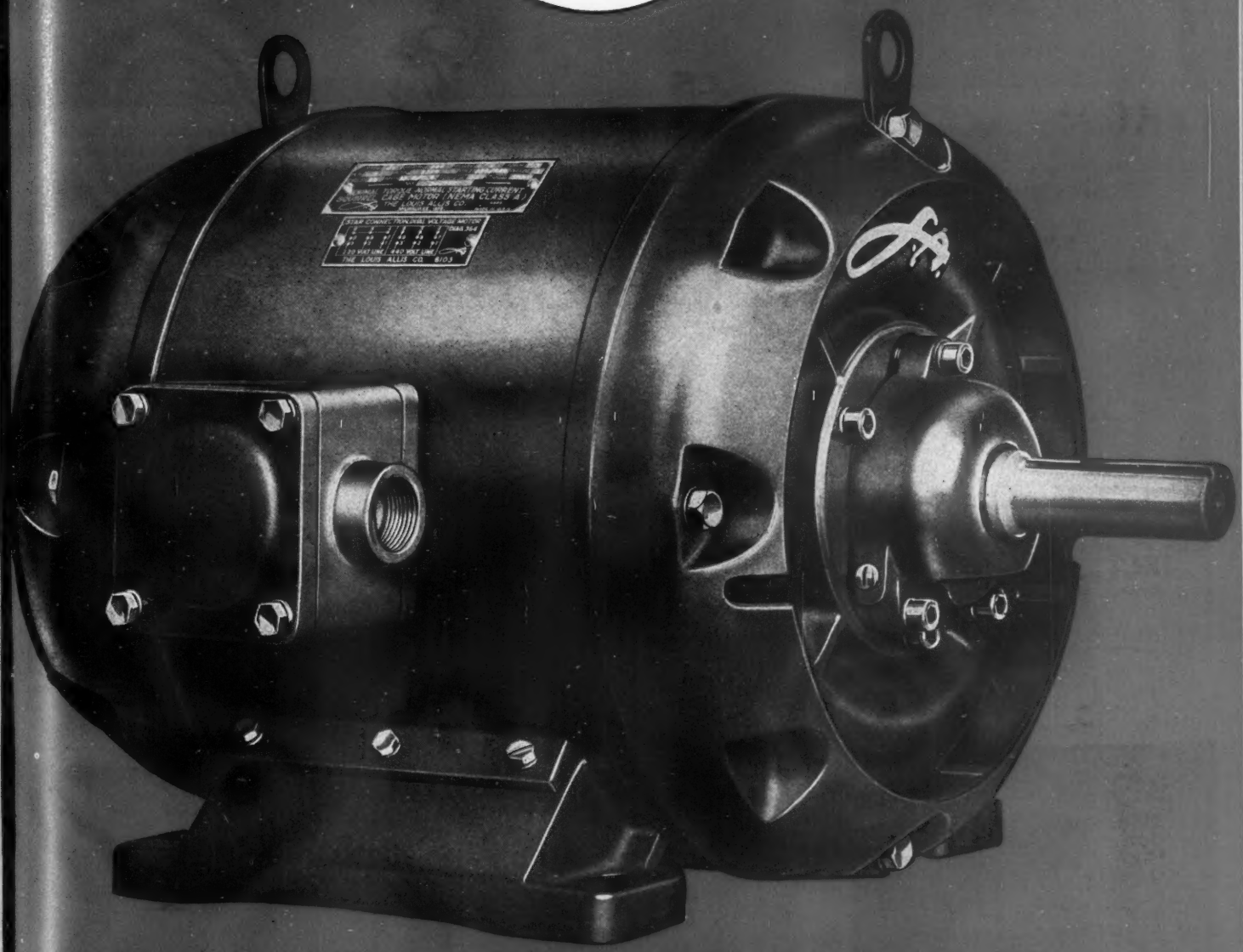
We have helped many food products to solve this problem, for the primary function of Riegel Papers has always been the *protective* packaging of food...and we have helped to do it simply, quickly and inexpensively through variations or combinations of known materials.

These increased demands and government restrictions on output now prevent us from accepting new business...but we are still just as able and willing as ever to help you find a solution to your present packaging problems or to assist in preparing new horizons for your food packaging of tomorrow.

RIEGEL PAPER CORPORATION

95 342 MADISON AVENUE • NEW YORK, N. Y.

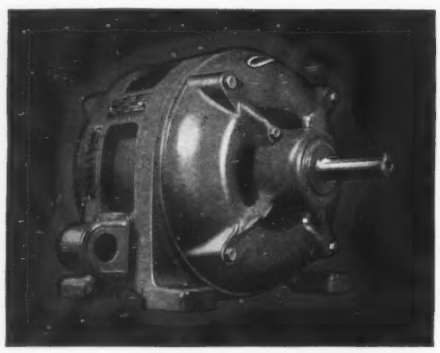
LOUIS ALLIS



A Size and Type Electric Motor for Every Industrial Requirement

THE LOUIS ALLIS CO., MILWAUKEE, WIS.

There is a Size and Type Louis Allis Mo

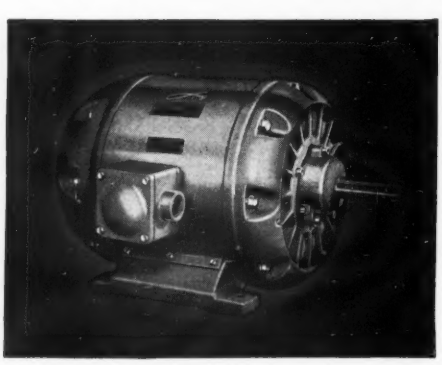


Standard open SQUIRREL CAGE polyphase motors are carefully engineered, precision built motors with rigid construction throughout and adequate insulation you can confidently apply to your toughest jobs.

Louis Allis protected type squirrel cage motors (Type OG) are specially engineered and designed for applications requiring greater protection. Complete details sent upon request.

SPLASH-PROOF motor. Designed and built from the ground up as a real splash-proof motor—full protection against acid spills—splashing liquids—high humidity. Completely protected by cast iron housing.

Louis Allis motors can be supplied with a very wide range of various types of GEAR REDUCERS — integral — all-motor — gear-head —vertical—right angle or parallel—the proper drive for every industrial application.



EXPLOSION-PROOF motor for use where gasoline and other petroleum products, lacquer solvents, and equally hazardous liquids are made, used or handled. Approved by underwriters'.

We have developed special RAPID REVERSING squirrel cage motors capable of as many as 100 reversals per minute continuously without overheating. If you have a product or manufacturing operation requiring rapid reversing action, we would be glad to outline more of the details and advantages of this unusual type motor for your particular problem. Your inquiry is solicited.

TOTALLY ENCLOSED FAN COOLED motors—for operation in atmospheres containing abrasive dust, corrosive fumes, dirt, oil combustible dust, and similar conditions such as are usually found in machine shops, foundries, chemical plants, grain elevators, coal pulverizing plants, etc.

Louis Allis totally-enclosed fan-cooled ARBOR TYPE motors are especially adaptable for applications where the available space for mounting is limited. These motors are available in a wide range of sizes and electrical characteristics. Complete information upon request.

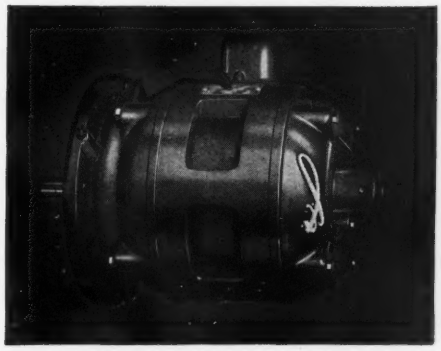
A complete line of enclosed NON-VENTILATED motors is available in a wide range of mechanical and electrical characteristics. These motors are ruggedly constructed with solid cast iron housings to withstand severe treatment on difficult jobs.

No matter what your electric motor problem or requirement may be—we earnestly request your inquiry. Your needs will receive our most prompt and careful attention in every way.

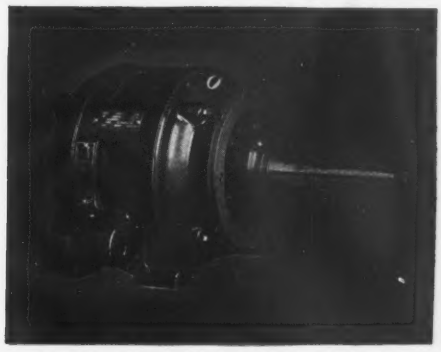
THE LOUIS ALLIS CO., MILWAUKEE, WIS.

Motor for Every Industrial Requirement . . .

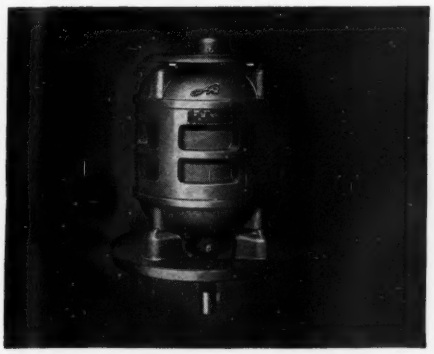
If you have a product or manufacturing operation requiring 2, 3 or 4 speeds—write for copy of Bulletin 500-A fully describing Louis Allis MULTI-SPEED motors. Available in special electrical and mechanical modifications to meet specific requirements.



Louis Allis FLANGE-TYPE motors are available in an exceptionally large range of both electrical and mechanical features. End mounting of motor in this manner saves considerable space. We will gladly send more complete information regarding this type motor upon your request. Motor illustrated shows "B" type flange mounting.



Standardized flange mounting for mounting centrifugal pump directly on motor bearing bracket is shown in the above illustration. No matter what your "direct mounting problem" is we invite your inquiry.

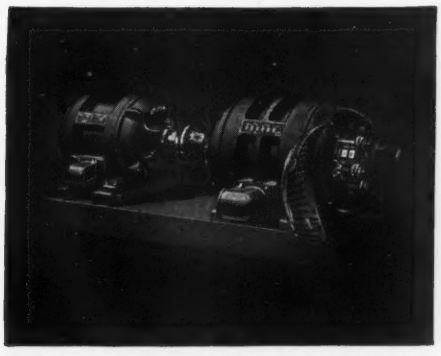


Louis Allis VERTICAL motors can be supplied without base, with ring base, or with special base to meet specific requirements. Can be supplied with same electrical or mechanical modifications as horizontal motors. Additional information gladly sent upon request.

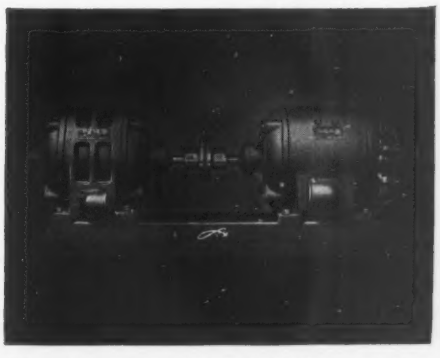
HOUSING TYPE SHAFTLESS motor developed for built-in motor drives on machine tools and special machinery. Furnished without shafts, bearing brackets or bearings—attached as an integral part of the driven machine. Available in all types of electrical modifications. Recommendation for your specific application gladly sent upon request.

The widespread experience of our engineering staff will be cheerfully placed at your disposal to assist in powering your product with these compact efficient SHAFTLESS motors. Available in wide range of sizes and electrical modifications.

These WOUND ROTOR (slip ring) motors are ruggedly constructed throughout. A wide range of speed variations are obtainable with comparatively simple control. Available with mechanical modifications for every industrial requirement.



These FREQUENCY CONVERTERS are designed to deliver higher speeds than are obtainable with direct current motor drives operating on 25 or 60 cycle supply lines. Available in both two-bearing and four-bearing types.

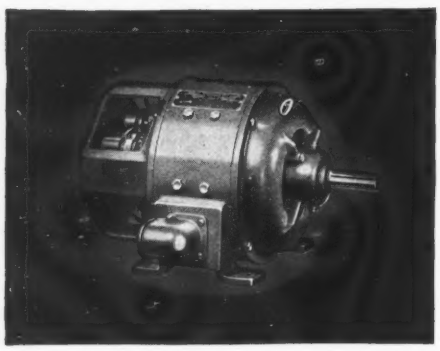


Louis Allis D. C. GENERATORS are built in sizes ½ to 50 Kw. and are of the same general characteristics as our regular D. C. Motors. Standard speed ratings are made the same as for induction motors. Complete details sent upon request.

If you are planning a post war product that will require a special electric motor in its construction, our engineering development department will welcome the opportunity of working with you.

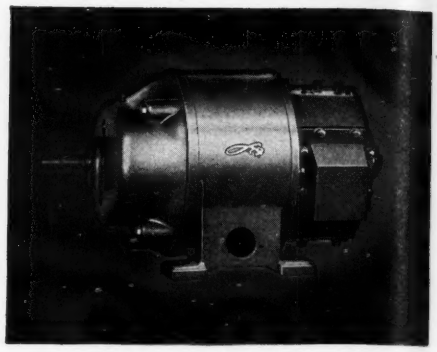
THE LOUIS ALLIS CO., MILWAUKEE, WIS.

Specify by Name—Louis Allis

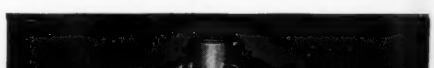


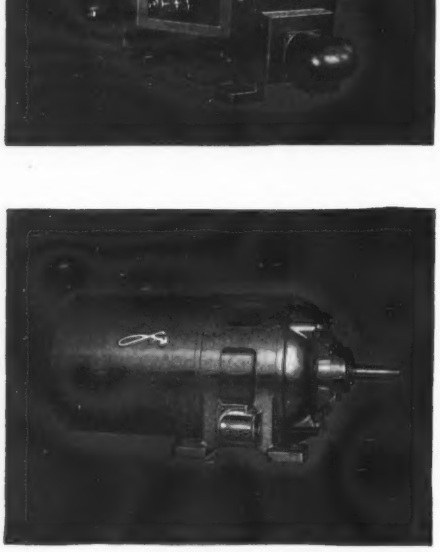
These DIRECT CURRENT motors are correctly engineered and precision built—available in a very wide range of both electrical and mechanical modifications. The extra rugged construction of these motors assures long life to dependable performance.

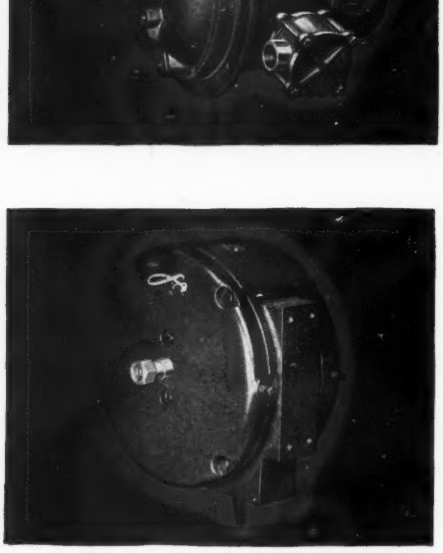
This PROTECTED D. C. motor has the same general construction features of the motor illustrated above. The specially designed protective end bell and armature coverings make this motor especially adaptable for use in coal mines, quarries, or where dropping particles may hit the motor.

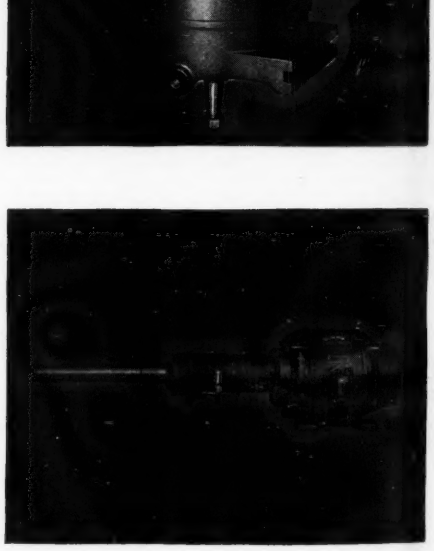


This D. C. SPLASH-PROOF motor is designed from the ground up as a real splash-proof motor and assures dependable trouble-free performance where the motor is subject to dripping and splashing liquids or where the motor is washed with a hose for sanitary reasons.









The day of trying to use a standard motor for a special job is over. *Machinery designers have learned that it is much more efficient and economical to obtain a motor with exactly the electrical and mechanical characteristics required to perform a specific job than it is to try to doctor up a standard shelf motor to do the job.*

Above are shown several typical examples of special motors recently built for some of our customer friends, the details of any of these will gladly be sent to you upon your request.

For over 40 years we have been developing special motors for special jobs—our engineering development department has a wealth of experience along this line—it is at your disposal. No matter what your electric motor problem or requirement we sincerely believe that our engineering development department can serve you to your decided advantage. We solicit your inquiries.

THE LOUIS ALLIS CO., MILWAUKEE, WIS.

Prewar carrots —still going strong!

... A PACKAGER'S DREAM COME TRUE

WAY BACK WHEN. It was two months before Pearl Harbor that these carrots were plucked and cleaned and stored away. Stored in sealed-tight wrappers of Goodyear's extraordinary moisture-proof, airproof **Pliofilm.** *That* was more than a year and a half ago.

RIGHT NOW. You know what ordinary unwrapped carrots look like after a few short weeks. *Now* look at those **Pliofilm**-protected carrots above, after *eighteen months* at 37° F.! Or listen to the official report of the Agricultural Experiment Station of the University of Florida, which made the test: "Loss of weight was negligible, and the carrots held their color perfectly . . . retained their firmness and vitamin content."

And this is only one of many similar sensational results which have been obtained in tests with oranges, grapefruit, lemons, cabbages, apples, peaches, mangoes and other fruits and vegetables!

AND TOMORROW. Today, of course, we are unable to supply you with **Pliofilm** for it is a war-worker-only. But forward-looking marketers are invited to consider the postwar packaging possibilities of this great freshness-preserving material. **Pliofilm** performs the same safeguarding miracles for cheese, meat loaf, sausage, coffee, nuts, pharmaceuticals, chemicals and other air-moisture-sensitive products — seals natural juices *in* — seals unwanted moisture *out.* For further information, write: **Pliofilm** Sales Dept., Goodyear, Akron, Ohio.

Pliofilm

GOODYEAR
THE GREATEST NAME IN RUBBER

Pliofilm—T.M. The Goodyear Tire & Rubber Company

Are your kettles, too, working OVERTIME ?

The Care of "WEAR-EVER" STEAM JACKETED KETTLES
"WEAR-EVER" Steam Jacketed Kettles are so designed that cleaning of both interior and exterior surfaces can be readily accomplished with a minimum of effort.
We suggest the following procedure:
Kettle: There are just a few simple rules to follow if you want to keep "Wear-Ever" Steam Jacketed Kettles looking like new.
1. Wash bath inside and outside with hot soapy water, rinse with clear hot water and dry thoroughly after each use.
2. To remove sediment or stain, use "Wear-Ever" Cleanser or No. 0 Steel Wool with a good soap. Kettle should then be washed, rinsed well and thoroughly dried.
3. If food adheres to the kettle and steel wool is not a desirable abrasive, brushes made of fine wires of monel or nickel silver can be used with excellent results. These brushes are obtainable from our nearest warehouse.
4. In choosing any cleanser or soap to be used with aluminum, select one which does not attack the metal and is free of alkaline substances. Most cleaners on the market have directions for use with aluminum. These directions should be followed carefully.
A clean kettle will not impart foreign flavors or colors to food, nor will a clean kettle pit readily. "Wear-Ever" aluminum is easy to clean and keep clean. If some one is designated to keep the equipment clean and given proper instructions on how to do it, the kettles will look like new—even after many years of service.
Water Space (Jacket): In some localities difficulty may be encountered, especially in gas fired steam jacketed kettles, with a deposit of lime forming between the inner and outer shell. Definite instructions for the removal of this deposit can be secured by writing to The Aluminum Cooking Utensil Company, New Kensington, Pennsylvania.
Safety Valve: All dirt and sediment should be cleaned from the safety valve once daily by pulling the small red tag attached to the valve-lever.
A corner of the kitchen in the Belvedere Hotel, Baltimore, Maryland.
"Wear-Ever" Steam Jacketed Kettles at sea on the U. S. S. Yorktown.

Get your free copy NOW

The page shown above is not the only one that is important in the book, "Wear-Ever Steam Jacketed Kettles." It also tells you how you can conserve food and fuel, and how you can prepare better tasting foods. For your free copy, write THE ALUMINUM COOKING UTENSIL COMPANY, 308 Wear-Ever Building, New Kensington, Pennsylvania.

Your Wear-Ever Steam Jacketed Kettles are doubtless working long hours these days. Since new kettles are no longer available and repair parts are hard to get, you will want to take extra good care of the kettles you have.

Yes, there is another good reason to take care of your Wear-Ever kettles. To save money! Because aluminum conducts heat fast and evenly, develops no hot spots, less food is wasted by burning and scorching. Proper care means longer life for your Wear-Ever kettles.

When the war is won you will be able to buy better-than-ever Wear-Ever Aluminum products of all types. But in the meantime, get this book and use the tips it gives you on maintenance of your present equipment.

Wear-Ever Aluminum

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT OFF.

★ WHEN IT'S ALL OVER W-E WILL BE BACK! ★

Take a Look at TOMORROW—*Today!*

Mr. Now: Dried out, *soaked, and baked,* eh! So that's why Century Motors stand up!
Mr. Postwar: I'll remember that — it's another reason why I shall specify *Century* Motors.

Century Form J Motor

The Protection of
CENTURY INSULATION
Assures Continuous Motor Performance Under the Toughest Conditions

By the use of slow-moving conveyors and automatically-controlled ovens, the completed stator and winding of Century Motors is dehydrated, and then is submerged in and passes through a tank filled with Century "Clingto" insulating varnish, and then baked. This process is repeated as necessary to preserve and seal the winding into a homogeneous mass.

This is followed by a final coat of Century "Protecto" insulation compound which places a heavy exterior protecting armor over the entire winding.

Century slot insulation is built up with fibre board for mechanical strength and varnished cloth for dielectric strength.

The entire Century insulation process produces a winding that is highly resistant to moisture, to tropical climatic conditions, to mild acid and alkali fumes, and to the effect of magnetic vibration and the mechanical impact of particles carried by the cooling air.

Such insulation material and treatment is absolutely necessary for motor protection for long operating life.

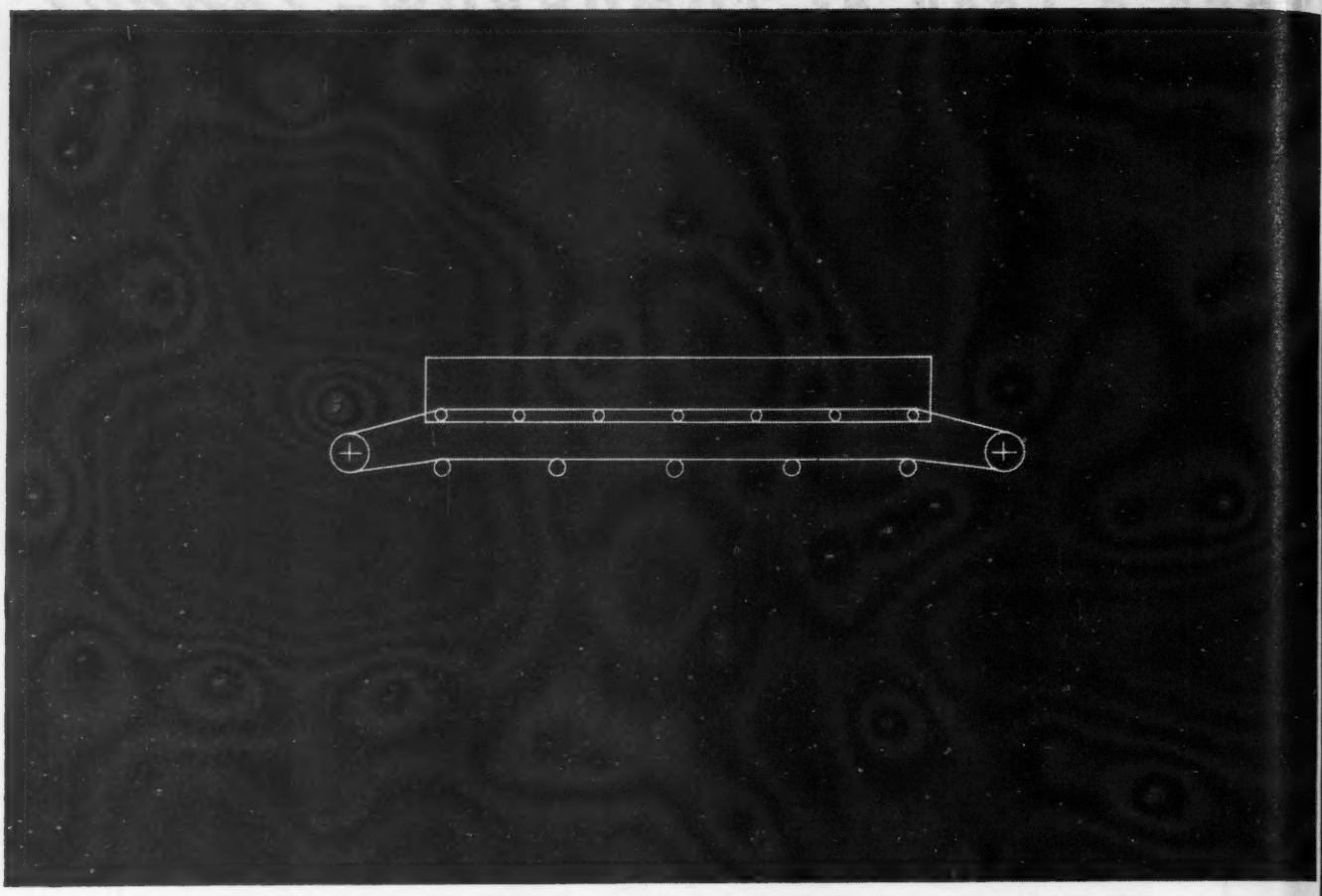
Your nearest Century Application and Service engineer will gladly give you full details of all the advantages of Century Motors—show you why thousands of plants rely on Century for continuous, all-out production.

Century MOTORS
1/6 to 600 horsepower

CENTURY ELECTRIC CO.
1806 Pine Street
St. Louis, Missouri
Offices and Stock Points in Principal Cities

307

One of the Largest EXCLUSIVE Motor and Generator Manufacturers in the World.



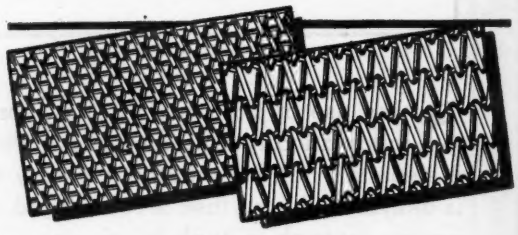
The Coming Challenge to Costs

Your post-war competition may be world-wide . . . against wage and living standards not yet up to America's. The American way to beat it is with *equipment* and *methods* that cut costs.

Wissco metal conveyor belts are demonstrating how they can save time and money in *war* production. Do you know what they can do for your competitive *peacetime* costs?

More and more industries are learning that these durable metal conveyor belts simplify and speed a variety of processes. Wissco, the pioneer, custom-engineers each belt to meet the requirements of a specific job—high or low temperature, chemicals, abrasion or other punishment.

Send for free book "Wissco Metal Conveyor Belts". Wickwire Spencer Steel Company, 500 Fifth Avenue, New York (18), N. Y.—or Buffalo, Chicago, Worcester, San Francisco.



OPERATING COST?

Wissco Conveyor Belts are designed for greatest load-carrying capacity per unit of weight. Thermal capacity is low in relation to load capacity . . . hence fuel economy. Records show their long life and low upkeep.

A FEW PRESENT USES

Annealing Ovens	Dehydrating
Hardening Furnaces	Canning Operations
Brazing Furnaces	Chemical Processing
Degreasing	Decorating Glass, Ceramics

Reclaiming Tin, Rubber, etc.

★ WISSCO ★

CONVEYOR BELTS FOR EVERY PURPOSE

Prevent Valve Failure *before it starts!*

COMPARE

ABRASIVE WEAR

ruins a Yoke Sleeve—forces a shutdown when lubrication is neglected

Because regular lubrication was neglected, this yoke sleeve from an OS&Y Gate Valve wore out rapidly and failed in service. Important plant operations were stalled when the line was shut down to make the necessary replacement.

As the illustrations indicate, the original sturdy flange on the base of the yoke sleeve (or bushing) was reduced to a wafer-thin "washer" by abrasive wear, and then it sheared off. Since the (yoke sleeve) flange must withstand the entire thrust when the valve is tightly closed, and also when the valve is back seated in the fully open position, it is extremely important that its original strength be maintained by proper lubrication and care.

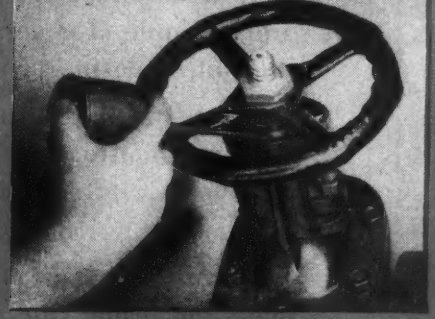
"Hit or miss" lubrication schedules also take their toll of outside spindles, as illustrated. Threads left dry and unprotected are worn by grinding grit on the thread bearing surfaces, threatening sudden failure and injury to operatives, as well as damage to property.

Such production-stalling, metal-wasting valve failure *can* be prevented. Inspect valves frequently, systematically. Repair or replace worn parts in time to prevent valves from destroying themselves. See that new valves are carefully selected, installed by experts. And train new men in care and maintenance.

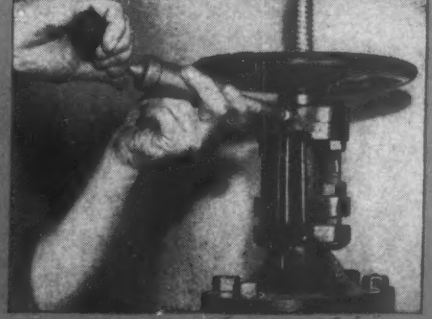
Jenkins Engineers will assist any management in preparing an effective program of valve conservation.

Lubricate Valves on Schedule

—at least Once a Month—to prevent such failures

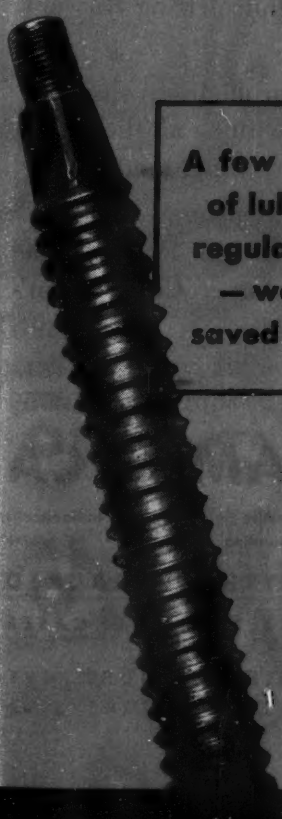


Jenkins Iron and Steel OS&Y Gate Valves have a drilled hole in the yoke cap to supply oil to the moving parts. On the larger size valves, a grease gun fitting is provided in place of the oil hole.

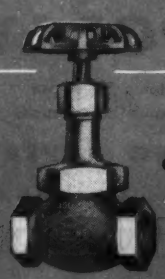


Valves should be lubricated once a month, more often when operated frequently. Outside screw threads should also be cleaned and lubricated, and shielded when dust conditions are severe.

A few cents worth of lubrication — regularly applied — would have saved this spindle



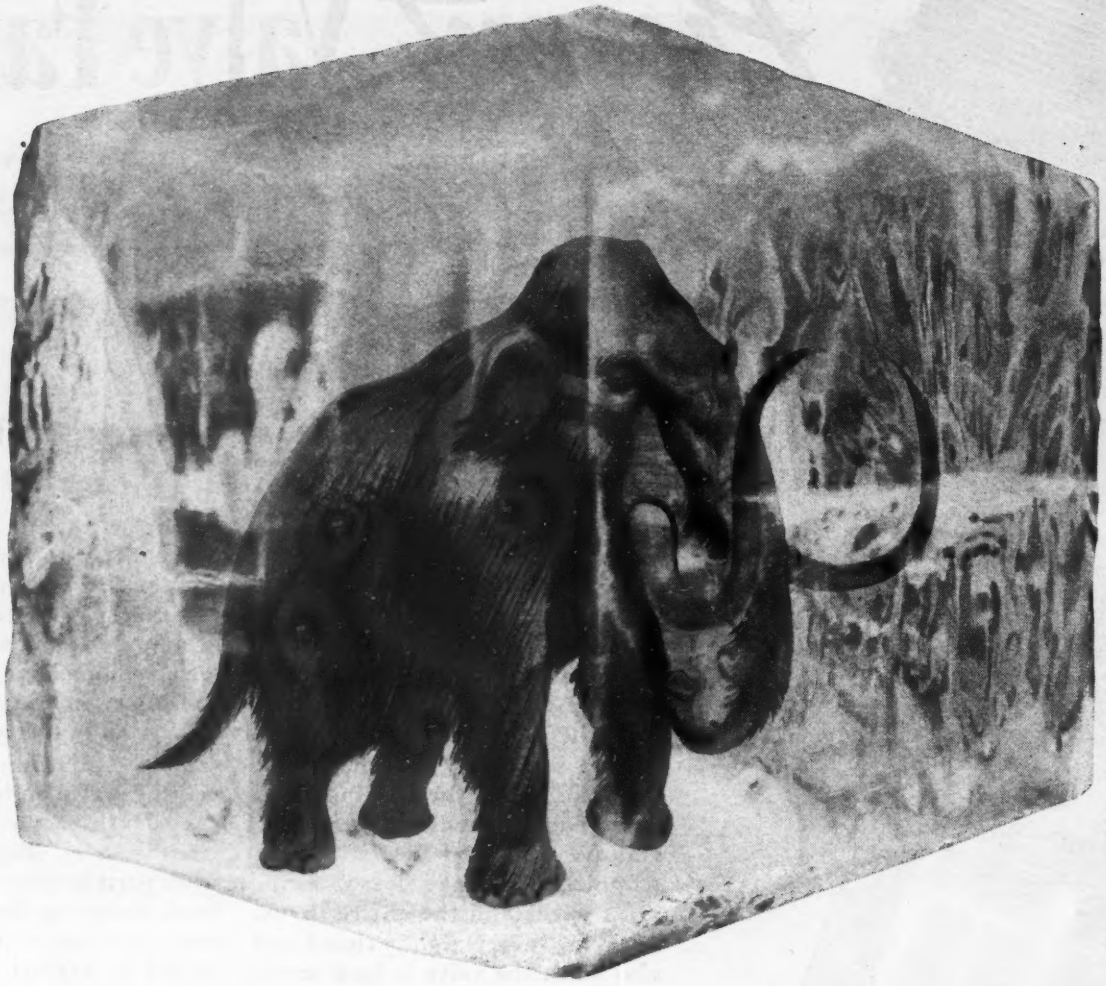
Jenkins Bros., 80 White Street, New York, 13, N. Y.; Bridgeport; Atlanta; Boston; Philadelphia; Chicago. Jenkins Bros., Ltd., Montreal; London.



JENKINS VALVES

SINCE 1864

For every industrial, engineering, marine and power plant service . . . in Bronze, Iron, Cast Steel and Corrosion-Resisting Alloys...125 to 600 lbs. pressure.



Grandfather of quick-freezing!

• Nature did it first! Some fifteen thousand years ago, Nature quick-froze a number of Hairy Mammoths in northern Siberia. And a couple of generations ago, some enterprising Russians did quite a business in Mammoth steaks.

• Nature was lucky. She didn't have the problems of shipping, display or moisture vapor loss to contend with — all the factors that must control modern packages, freezing method and routine.

• There is *one correct package* for each frozen food . . . and that's the prime rule recognized by Container Corporation's frozen-food staff.

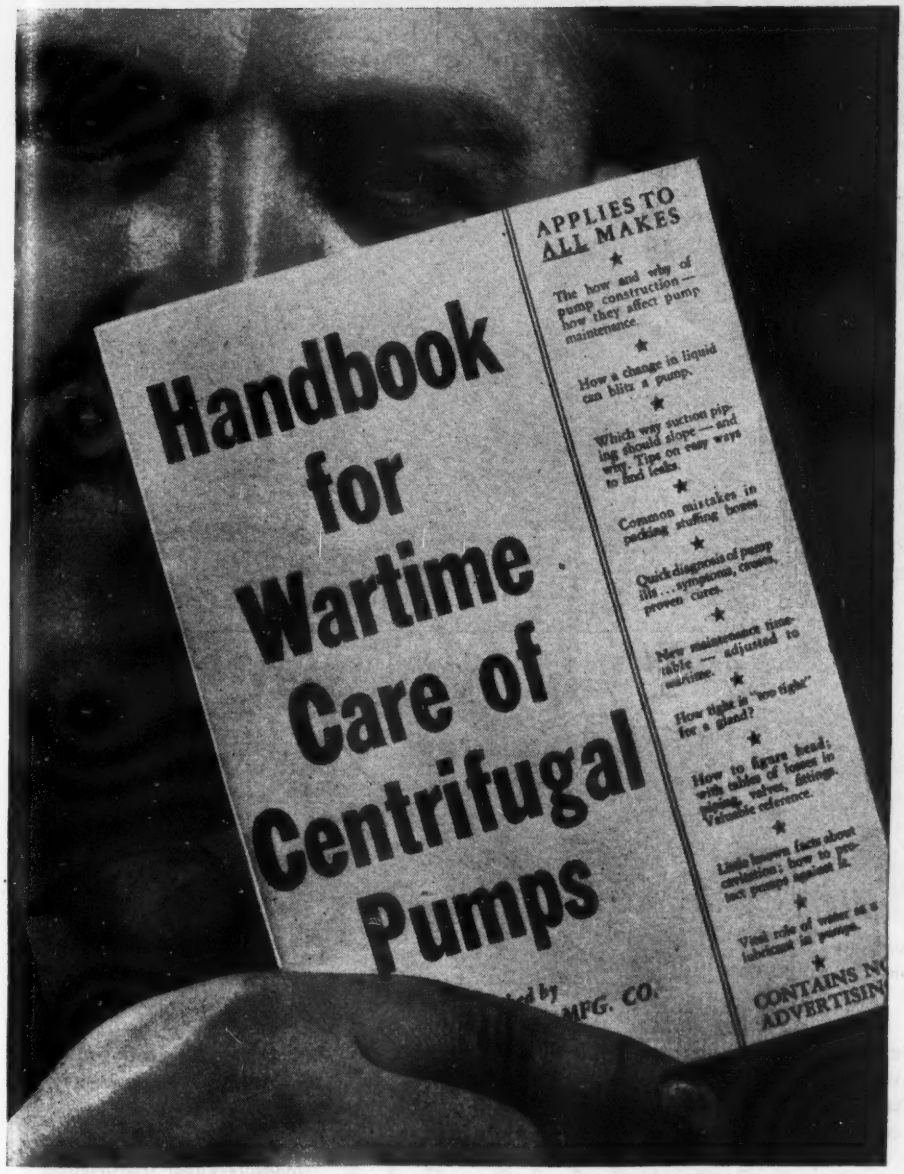
CONTAINER CORPORATION OF AMERICA

Chicago • New York • Rochester • Natick, Mass. • Philadelphia • Akron • Cincinnati • Cleveland • Circleville • Detroit • Indianapolis
Wabash • Carthage • Anderson, Ind. • Peoria • Rock Island • Minneapolis • Baltimore • St. Louis • Fernandina • Dallas • Ft. Worth

EVERYTHING PAPERBOARD FOR EVERYTHING PACKED

FOLDING CARTONS • BOXBOARDS • CORRUGATED AND SOLID-FIBRE SHIPPING CASES

"It's Tops on Pumps!"


Handbook for Wartime Care of Centrifugal Pumps
APPLIES TO ALL MAKES
The how and why of pump construction — how they affect pump maintenance.
How a change in liquid can blitz a pump.
Which way suction piping should slope — and why. Tips on easy ways to find leaks.
Common mistakes in packing stuffing boxes
Quick diagnosis of pump ills . . . symptoms, causes, proven cures.
New maintenance timetable — adjusted to wartime.
How tight is "too tight" for a gland?
How to figure head, with tables of losses in piping, valves, fittings. Valuable reference.
Little known facts about cavitation; how to prevent pumps against it.
Vital role of water as a lubricant in pumps.
CONTAINS NO ADVERTISING

When you do need new pumps—take a good look at the extra efficiency, ruggedness and long life built into Allis-Chalmers centrifugal pumps . . . the famous "Electrifugal" — and all types for every purpose. Meanwhile, let "Handbook for Wartime Care of Centrifugal Pumps" help you make present pumps *last*! →

ALLIS-CHALMERS
MILWAUKEE

WE WORK FOR VICTORY — WE PLAN FOR PEACE

YOUR TECHNICAL LIBRARY ISN'T COMPLETE UNTIL IT HAS A COPY OF ALLIS-CHALMERS' GREAT NEW PUMP MAINTENANCE GUIDE. IT'S FREE —SEND TODAY!

MOST BOOKS on pump care published before the war are *seriously out of date* today! Why? Pumps that used to work 1800 hours a year now work as many as *8700* hours! For *timely* aid get "Handbook for Wartime Care of Centrifugal Pumps!"

A pump is built, step by step, on paper. Tips and tables show how to diagnose, how to remedy trouble — apply to all makes of pumps. *It's Free*! Tear out and mail order form below today!

ALLIS-CHALMERS MFG. CO.
Milwaukee, Wisconsin

Gentlemen:
Yes, I would like to receive *free of charge* a copy of your "Handbook for Wartime Care of Centrifugal Pumps".

(Name)

(Title)

(Company)

(Street Address)

A-1585-3 (City and State)

Through Hell and High Water, Reynolds Foil Protects the First Aid Packet!

Allied infantry crawling forward under Japanese sniper fire in the Buna Area, New Guinea

The First Aid Packet Contains These Medical Supplies

ADVANCING in battle, every United States soldier carries the Army First Aid Packet on his back—a packet that's a miracle of medical science and a *marvel of modern packaging.*

Developed through the resourcefulness of the Army Medical Dept., the packet contains: the Carlisle bandage, sulfanilamide powder to prevent infection, sulfadiazine tablets to increase resistance to infection, and benzedrine sulfate tablets to prolong mental efficiency during long combat hours without sleep... *all protected by Reynolds New Metal Foil Packaging Material.*

This Reynolds Packaging—safeguarding vital food . . . munitions and drugs—is made of varied materials laminated to a solid sheet of metal foil. It's air-tight, water-tight, proof against light, insects, foreign odors, and moisture-vapor transmission. *Really armor-clad protection without the use of steel.*

Today, Reynolds presents this *battle-tested* material for application to your specific war and home front packaging problems. Tomorrow, Reynolds will give you the unbeatable combination of *its own abundant source of aluminum,* plus invaluable knowledge of packaging problems in every field.

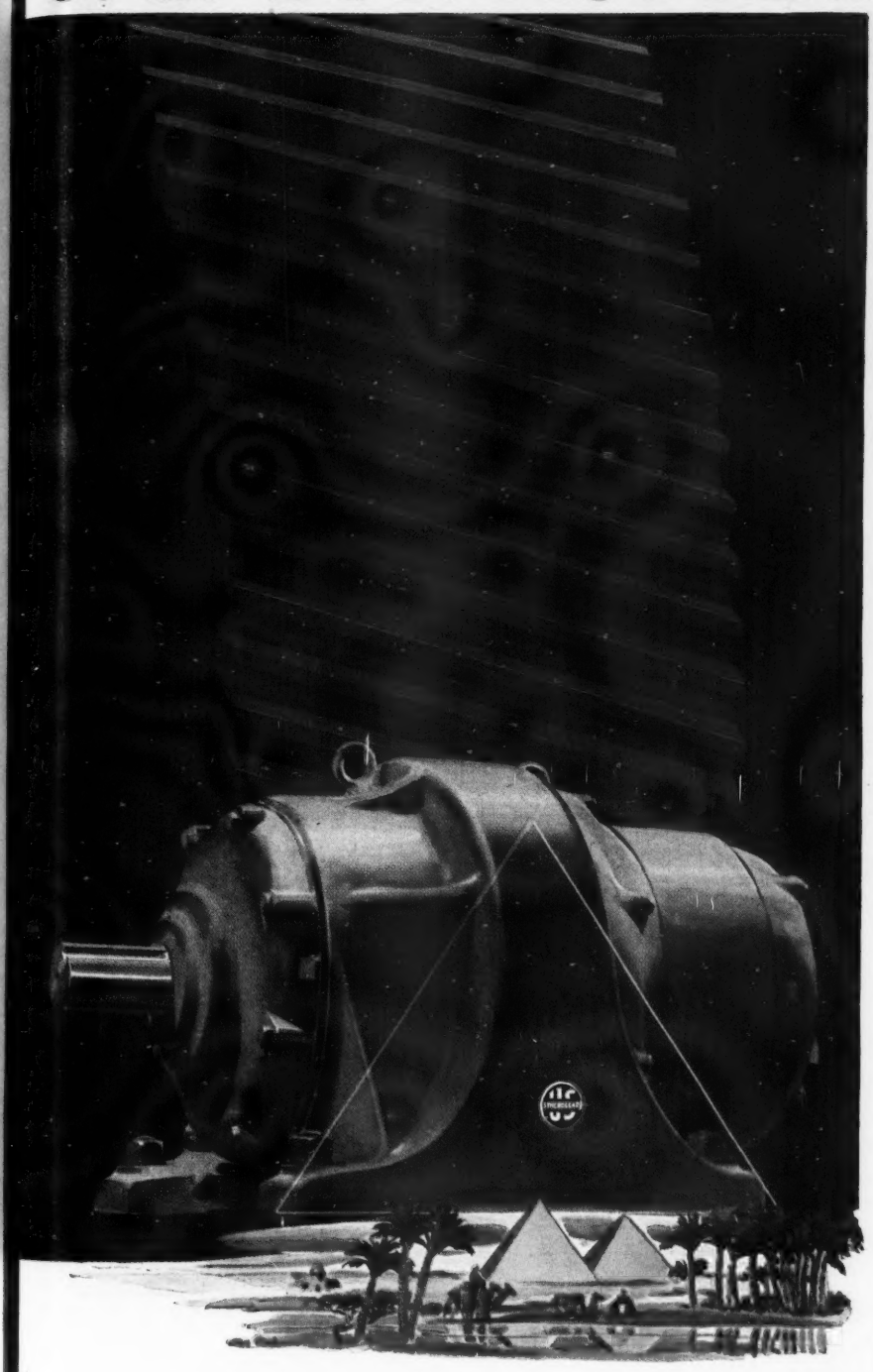
REYNOLDS ALUMINUM

Reynolds Battle-Tested Material Meets These Army-Navy Requirements!

1 *Positive Protection Against Moisture-Vapor Transmission.*
2 *Immersion-Proof. Keeps Water Out!*
3 *Protection Against Insect Infestation, Odors and Light.*
4 *Safe Protection for Long Storage Periods.*
5 *Substantial Saving in Tin, Steel and Other Strategic Materials.*
6 *Saving in Space, Especially Shipment and Storage of Empties.*
7 *Saving in Weight.*
8 *Serviceability Under Export Conditions.*

REYNOLDS METALS CO • FOIL DIVISION • GENERAL OFFICES • RICHMOND, VA.

U. S. SYNCROGEAR MOTOR



MULTIPLIED POWER
with
PYRAMIDAL STABILITY

The U. S. Syncrogear Motor is an advanced development in geared electric power. It is built as a high torque, low speed mechanism should be built when slow speeds and high torques are required. In its heavy-duty, high torque type the Syncrogear does *not* follow the conventional practice of mounting a train of gears on one end of a light motor frame. Instead, the motor element is mounted within a heavy pyramidal pedestal which is strongly proportioned to carry any load without distortion. The non-yielding base will never allow vital gear elements to get out of alignment, regardless of torque or mounting upon an uneven floor surface. The strong-lined pyramidal base gives the unit mechanical strength and a dynamic streamlined design.

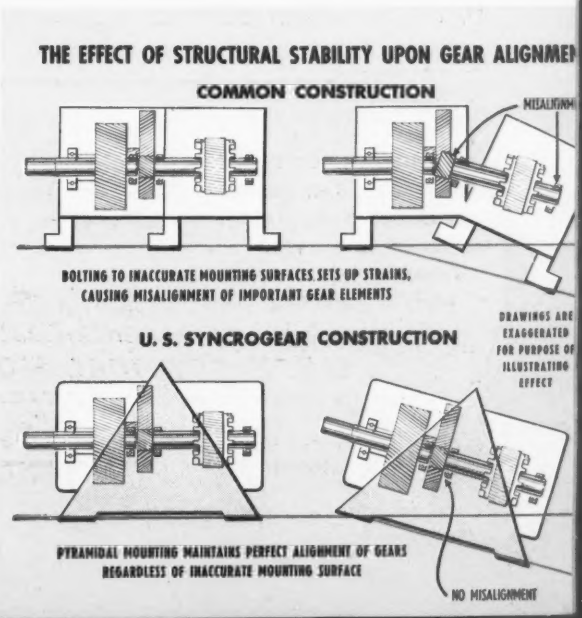
Any Speed
ranging from 2 to 10,000 r.p.m.

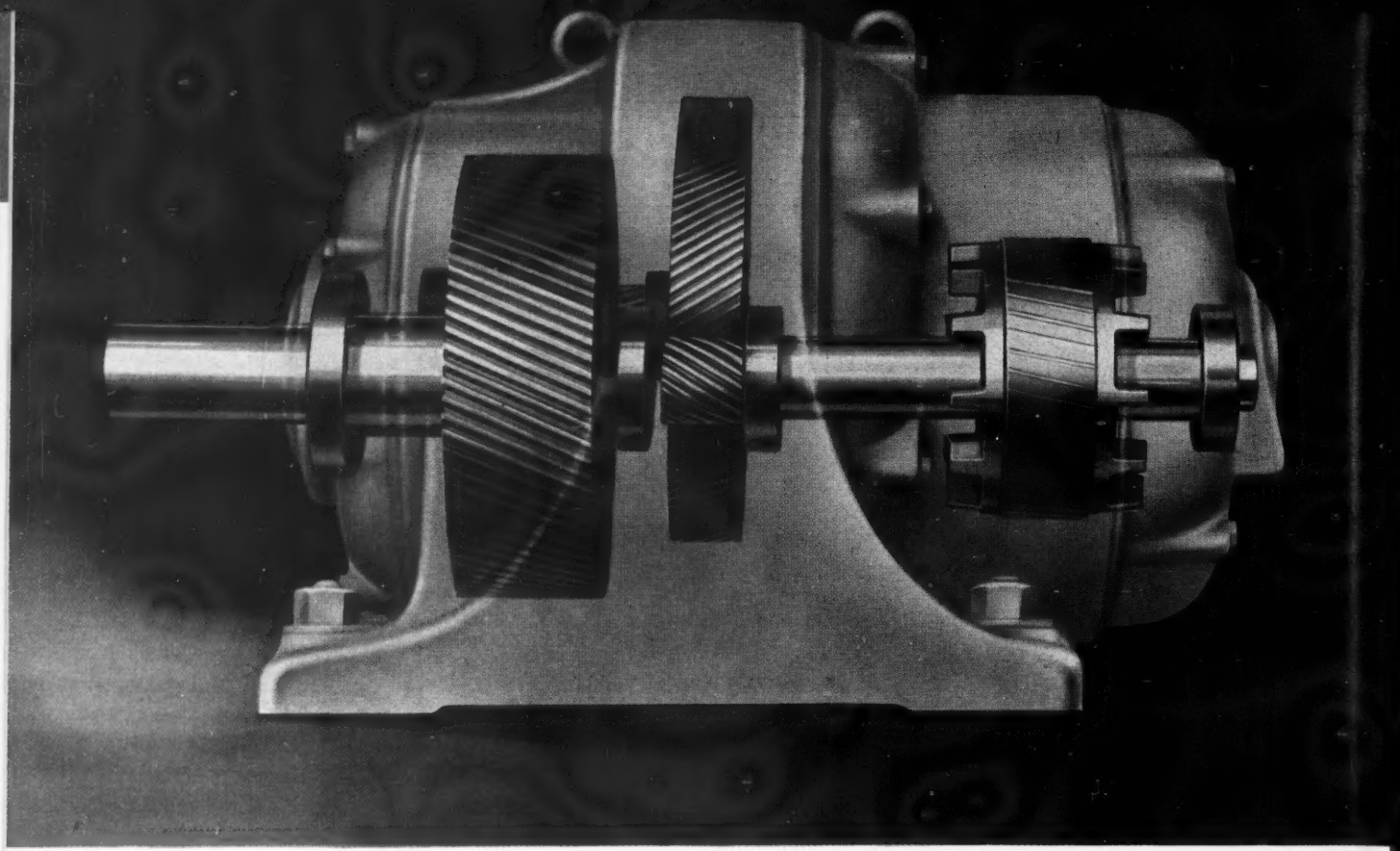
Speeds as low as 2 r.p.m. or as high as 10,000 r.p.m. are provided by U.S. Syncrogear Motors. Full rated horsepower of the motor is delivered at the take-off shaft. The windings of the motor are asbestos-protected, thus insuring against carbonization. The helical gears and pinions are an exclusive U. S. development. They are refined in design to provide a continuous rolling contact and smoothness of power flow with least resonance. Their meshing under heavy load is unusually quiet and free from pulsating noises. The tooth surfaces are shaved and honed to a tolerance of .0002" and are scientifically hardened to pass a test of 55/65 Scleroscope or higher.

The Syncrogear gives you multiplied power within a single compact unit. If you want variable speed you may select a Combination U. S. Varidrive-Syncrogear Motor which will give you double or triple reduction with infinite speeds.

SYNCROGEAR FEATURES

- PYRAMIDAL GEAR PEDESTAL
- NON-DISTORTING MOUNTING
- FULLY ENCLOSED TRANSMISSION
- GEAR-DIPPED LUBRICATION
- LUBRIFLUSH BEARING LUBRICATION
- PERMANENTLY-ALIGNED GEARS
- PYRAMIDAL GEAR TEETH
- CARBURIZED PINIONS
- GEAR HARDNESS—55/65 SCLEROSCOPE
- ANTI-FRICTION BEARINGS
- NORMALIZED CASTINGS
- ASBESTOS-PROTECTED WINDINGS


THE EFFECT OF STRUCTURAL STABILITY UPON GEAR ALIGNMEN
COMMON CONSTRUCTION
MISALIGNM
BOLTING TO INACCURATE MOUNTING SURFACES SETS UP STRAINS, CAUSING MISALIGNMENT OF IMPORTANT GEAR ELEMENTS
U. S. SYNCROGEAR CONSTRUCTION
DRAWINGS ARE EXAGGERATED FOR PURPOSE OF ILLUSTRATING EFFECT
PYRAMIDAL MOUNTING MAINTAINS PERFECT ALIGNMENT OF GEARS REGARDLESS OF INACCURATE MOUNTING SURFACE
NO MISALIGNMENT



NO HIGH TORSIONAL STRESSES IN U.S. SYNCROGEAR MOTORS

UNIFYING in the least cubical dimensions a geared transmission and motor unit, the U.S. Syncrogear Motor presents a most desirable assembly for structural stability. As shown in the above diaphanous view, the transmission is mounted integrally within a gear case supported by a heavy pyramidal base. Primary drive is provided by a U.S. Asbestos-protected Motor mounted on the gear pedestal. The fully-enclosed gear compartment excludes foreign matter. Oil reservoirs are sufficiently large to provide for an average of more than six months operation without additional supply. Gear-dipped lubrication permits the highest speed gears to operate without complete submergence, avoiding foaming. U.S. helical gears and pinions are most advanced in design, to provide a continuous rolling contact and smoothness of power flow with least resonance. The gears are hardened to 55/65 Scleroscope for maximum life. The Syncrogear minimizes cantilever stresses from overhanging gears by a short center gear-train structure.

Syncrogear Bulletin upon request.

U. S. Varidrive-Syncrogear Motor

U.S. Vertical Syncrogear Motor

U. S. Syncrogear Motor, Type GR

The QUALITY LINE of Power

VARIDRIVE MOTORS	*for infinite speeds*
SYNCROGEAR MOTORS	*for multiplied power*
UNICLOSED MOTORS	*Horizontal and Vertical*
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AERO-TEST STANDS	*for aircraft servicing*

AUTOSTART *Grinders and Buffers*

U.S. ELECTRICAL MOTORS Inc.

ATLANTIC PLANT: MILFORD, CONN. • PACIFIC PLANT: LOS ANGELES, CALIF.
Assembly Plant: Chicago. Branches: New York, Boston, Pittsburgh, Philadelphia, San Francisco, Seattle. Agents in all principal cities.

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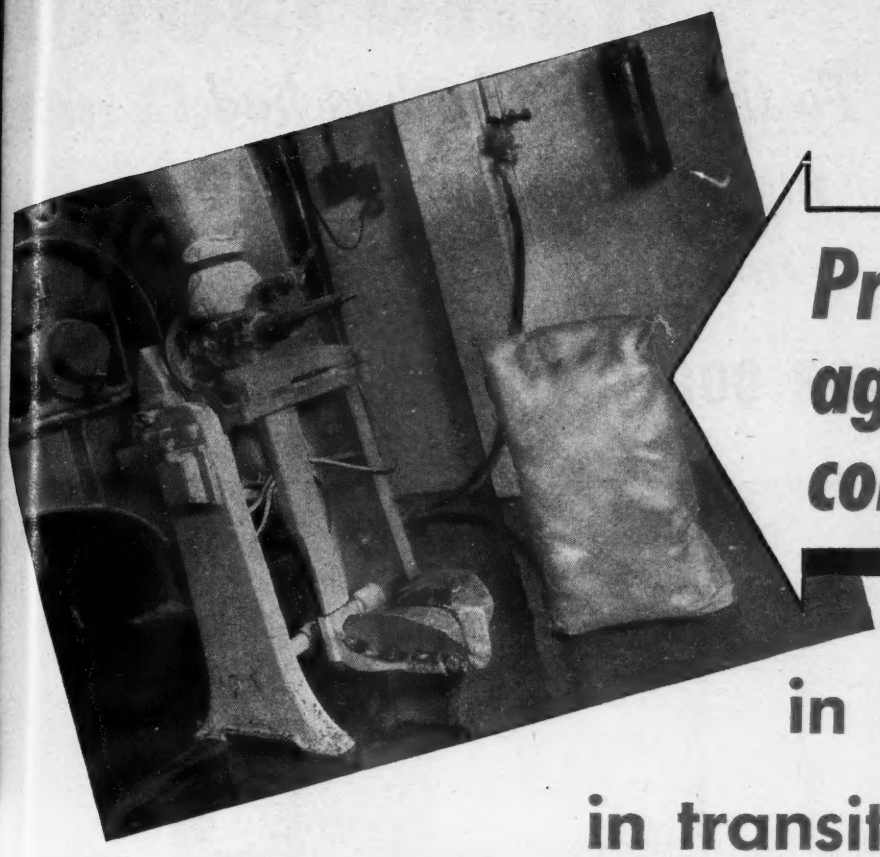

Protection against contamination in packaging... in transit...in storage

IN YOUR PLANT. Cleanliness is paramount. Extreme care is taken in processing foods to prevent contamination. Because St. Regis Screw Type Packers protect against contamination in packaging, many food producers now use these efficient Packers, installed in conjunction with their processing equipment.

Following manufacture, the product flows to the Valve Bag Packer where bags are filled and weighed—automatically and simultaneously. Pressure of the content automatically closes the valve—assuring a sift-proof closure and sealing the package against micro-organisms. At no time in the operation is the product touched by human hands or subject to any contamination.

IN TRANSIT. Multiwall Paper Bags are proof against rough handling and extreme weather conditions. Several layers of tough specification kraft are fabricated in tube form to withstand shipping hazards. Special sheets can be incorporated to resist moisture penetration and chemical action.

IN YOUR CUSTOMER'S PLANT the all-round protection of Multiwall Paper Bags continues until the bags are opened. None of your product can sift out – and no vermin can get through the rugged kraft walls. Your customer finds your product in the same fine, sanitary condition it left the plant.

St. Regis Engineers will be glad to design the correct Multiwall Paper Bag for your product – and to recommend and install packaging equipment to meet your production requirements.

St. Regis Valve Pack Systems include Impeller, Belt and Gravity Type Packers as well as the Screw Type Packer illustrated. Other St. Regis Systems are "Sewn Pack"—automatic sewing machines for efficient, economical closing of open-mouth bags, and "Tied Pack"—wire ties for secure, manual closing of open-mouth bags.

St. Regis MULTIWALL PAPER BAGS

MULTIPLY PROTECTION • MULTIPLY SALEABILITY

ST. REGIS PAPER COMPANY

TAGGART CORPORATION • THE VALVE BAG COMPANY

NEW YORK: 230 Park Avenue

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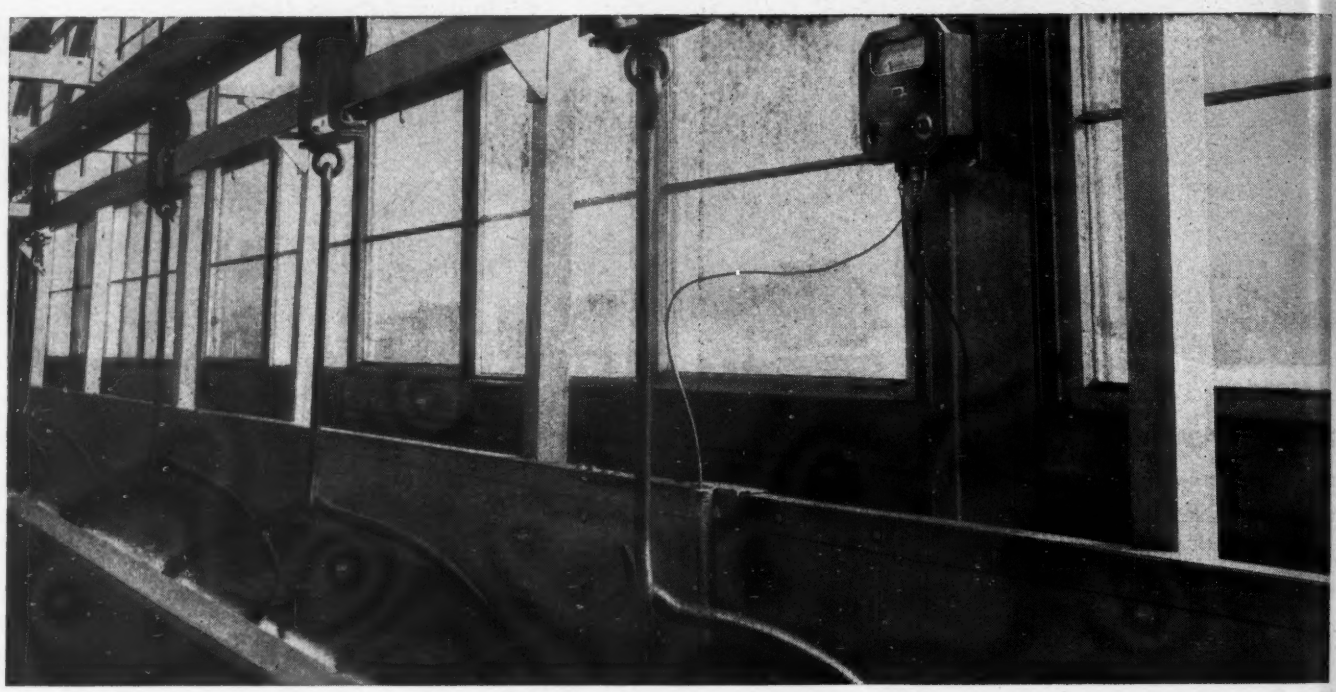
BATES VALVE BAG CO., LTD.
Montreal, Quebec
Vaucouver, B. C.

Baltimore, Md. Birmingham, Ala. Dallas, Tex. Denver, Colo.
Los Angeles, Calif. New Orleans, La. Seattle, Wash.
Franklin, Va. Nazareth, Pa. San Francisco, Calif. Toledo, Ohio

To the man who has had more important things to worry about than

TAYLOR COOLING CANAL CONTROL



WE'RE frank to admit that in prewar days there *were* more important things than cooling canal control. But in these times, with food and tin both scarce, ANYTHING that improves quality, prevents waste, or cuts cost is worth your serious attention. And Taylor Cooling Canal Control can *definitely do these things for you:*

1. Prevents Stack Burning by automatically maintaining correct cooling canal temperatures.

2. Cuts Down Spoilage by preventing bacterial growth which thrives in too-warm water and may penetrate even microscopic openings in improperly closed cans.

3. Prevents Rust in Storage by eliminating condensation caused by over-cooling. *A more important point than ever now that tin coatings are lighter.*

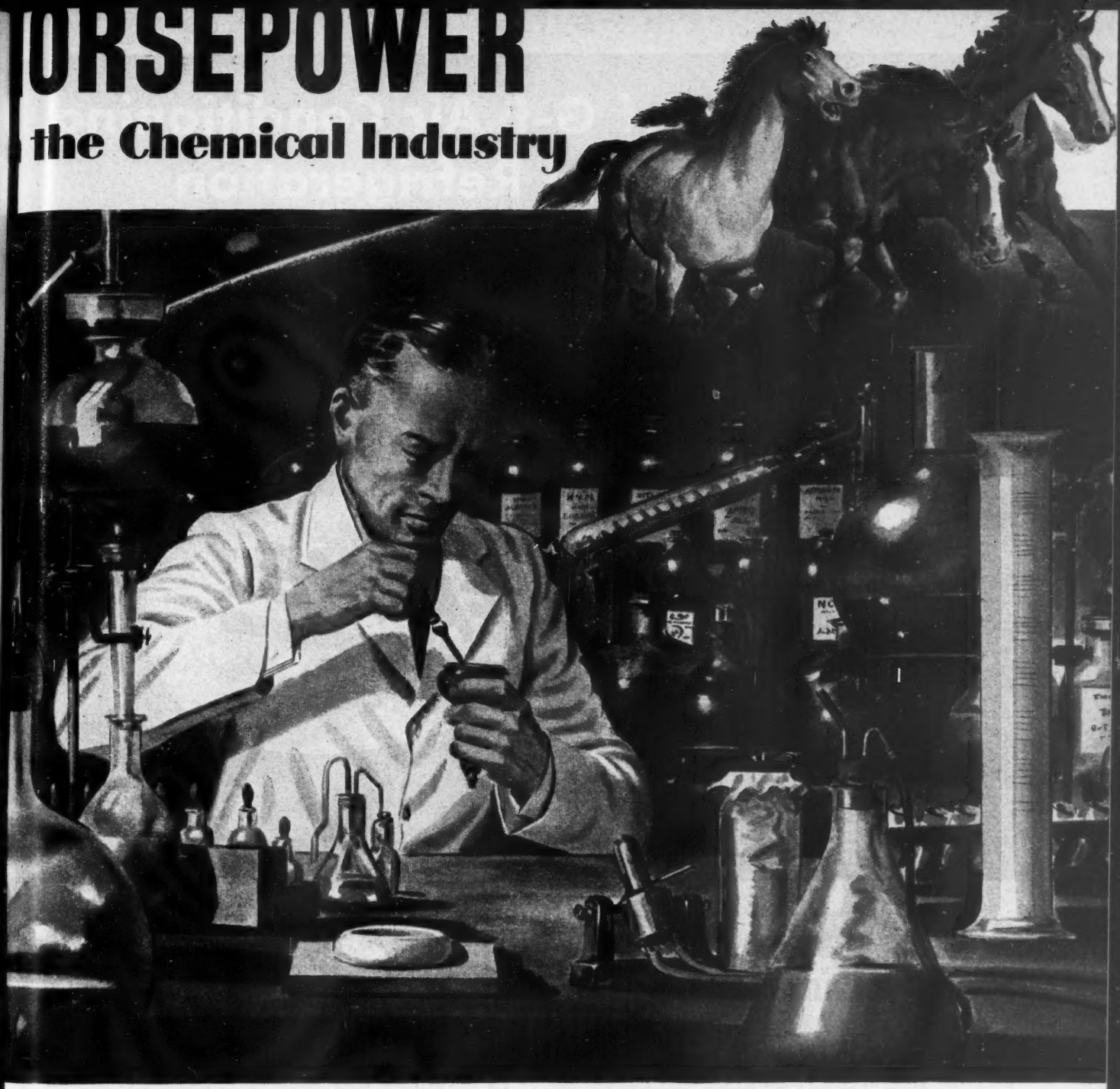
4. Pays for Itself in water savings, because the Taylor Cooling Canal Control System *supplies just enough water to keep the canal at proper cooling temperature.*

The Taylor Cooling Canal System is simple and inexpensive to install, and *you need it today if you never needed it before!* Ask your Taylor Field Engineer! Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording, and controlling temperature, pressure; humidity, flow, and liquid level.*

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

★ KEEP ON BUYING U. S. WAR BONDS AND STAMPS ★

ORSEPOWER
the Chemical Industry



More than 200,000 products entirely new to man have come from chemical laboratories since 1914. The amazing growth of America's great chemical industry is an outstanding example of what is possible under the free enterprise system. In the chemical field, as in all other great American industries, trouble-free, dependable Howell Motors are used extensively.

Magnesium from sea water! Colors from coal tar! Synthetic rubber from petroleum! Nylon from coal! These are among the innumerable achievements of chemistry.

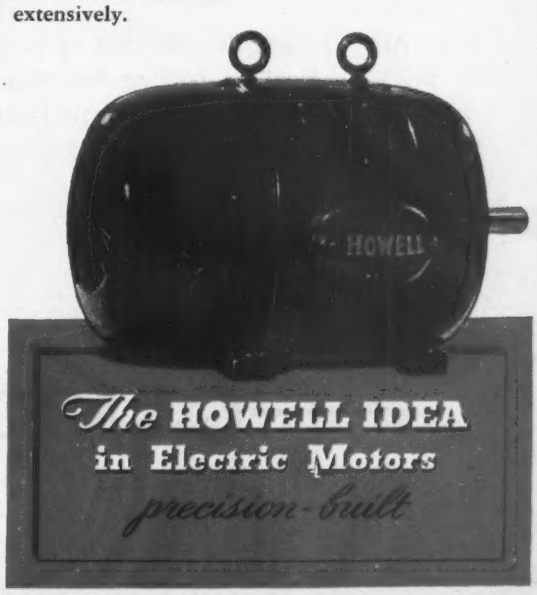
Few people realize the amount of electrical horsepower utilized and the importance of horsepower in this vast industry.

Howell Electric Motors have long been a favorite in the chemical industry, where the failure of a motor at a critical time might mean the loss of thousands of dollars.

This can mean but one thing: Howell Motors have what it takes to do the job better — more economically!

Now, that the War Production Board regulations require that you specify the simplest, lowest horsepower motor that will meet your requirements, it is to your present and future interests to insist on Howell — the precision-built motor.

Howell is the one motor you can "load" with full confidence in its ability to stand up under the toughest jobs within the limits of safety.



HOWELL ELECTRIC MOTORS COMPANY, HOWELL, MICH.

Manufacturers of Quality Motors Since 1915

To owners of G-E Air Conditioning, G-E Commercial Refrigeration

"PLEASE, BOSS... DON'T SMOTHER ME!"

Proper Maintenance Pays!

The condensing unit—which is the heart of your air conditioning or refrigeration equipment—must have air to operate properly. Packing cases or debris should *never* be piled close to it—make it a rule to keep the floor area clear for several feet around the unit.

Also, lint and dirt can clog up your unit—so clean the cooling fins occasionally with a soft bristled brush. Dust and dirt can do great harm to moving parts, too—accelerating wear and causing breakdowns.

Naturally, your unit must be oiled regularly (as per oiling instructions given for it)—and belts should be adjusted to maintain proper tension and alignment.

Such simple maintenance procedures will pay you big dividends in forestalling trouble and keeping your equipment operating efficiently, economically . . . for the duration.

General Electric Company, Air Conditioning and Commercial Refrigeration Divisions, Section 3898, Bloomfield, New Jersey.

GENERAL ELECTRIC

Meet a PACKAGE *that doesn't take chances!*

"Gas!"—

When that warning is heard, there's no time for checking up to see that a gas mask is in working condition. If it has deteriorated in shipping or storage en route to war areas, IT'S JUST TOO BAD!

Protection against every possible harmful condition calls for PACKAGING THAT DOESN'T TAKE CHANCES. Dobeckmun engineers provide the answer in this package which gets masks issued to service men, guarded from meddling hands—ready to do business.

But that's only one of the numerous wartime packaging jobs these Dobeckmun specialists have handled. They have put their accumulated experience into these assignments and have gained additional experience out of them—valuable know-how in meeting unusual and challenging packaging problems.

As wartime businesses are turned again to civilian needs, there will be many packaging problems to solve—

PACKAGES TO PROTECT DELICATE PRODUCTS

. . . to enhance "eye appeal"
. . . to meet and beat competition
. . . to cut packaging costs and shipping weight
. . . to make your product more successful

There's no obligation to you in opening a discussion of your current and anticipated packaging problems with Dobeckmun engineers. Subject only to the demands of Uncle Sam, they are at your service.

HERE ARE THE "SPECS!"

A jumbo-size double-wall moisture-proof cellophane bag which must pass rigid government tests for water and gas-tightness.

Similar bags function as box-liners for frozen eggs and a multitude of other products.

THE DOBECKMUN COMPANY
CLEVELAND, OHIO · OAKLAND, CAL

Your Wartime Package Needn't Be a Stranger!

It's quite a headache—this business of changing from the old, familiar container to a package of different materials, different shape, different size. And, after giving due consideration to the functional characteristics of the wartime successor, you find another problem confronting you—that of preserving the recognition features which have been established over the years.

Even though your new package falls in one of the many so-called "standardized" groups, it still is possible to express individuality. *Helping to preserve personality in wartime packages* is part of our job.

Consult with us on your change-over problems. Let us show you how to retain brand name, trademark design and quality appeal in *their established colors* even though the style of your package undergoes a revolutionary change.

As one of the world's largest producers of packaging materials, and as leaders in the field of Full Color Lithography, we offer you the benefits of experience, skill and ability to turn out packaging of various types in sparkling Full Color at surprisingly modest cost. Write us today.

FREE!
Our 28-page book —"The Value and Patriotic Use of Full Color" tells how to get beautiful results at low cost. Write today for your *free* copy.

For over 75 years—headquarters for high-quality, colorful, lithographed labels, box wraps, packets, folding boxes, cartons, merchandise cards and envelopes, displays and advertising materials.

Contractors to the Government—War Work Comes First!

STECHER-TRAUNG
LITHOGRAPH CORPORATION

Rochester, N. Y. **San Francisco, Calif.**

Offices in Principal Cities

OWI Photo by Palmer, in an Allegheny Ludlum Plant.

ANOTHER *Cooker* FOR THE STEEL BROTH OF WAR

TWO days after the men finished ramming in the bottom of this new 35-ton electric melting furnace, it was in full operation on stainless steel for the war assembly lines.

Allegheny Ludlum plant capacity has been expanded at record pace. Our output of stainless steels (tool, valve, and other alloy steels, too) has been doubled, tripled, quadrupled—as fast as the supply of alloying elements would permit it.

Production will continue to increase, but the appetite of war is insatiable in this critical year. It is imperative that the supply of stainless steel be made to go *farther,* by being used *better.* How much can rejects, spoilage, and all other forms of waste be reduced? Where can standard gauges, sizes and finishes be used instead of special ones; low alloys substituted for high?

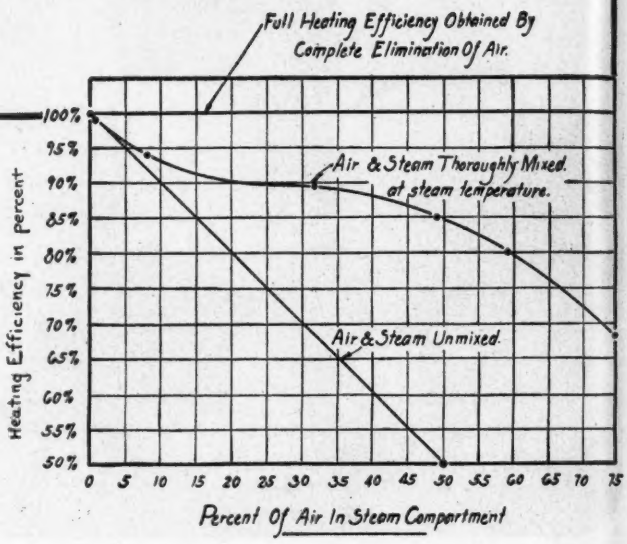
● Help us, and let us help you, to protect and conserve the nation's supply of these vital alloys. Write or phone us for printed data, or the assistance of our Technical Staff.

ADDRESS DEPT. FI-4

Allegheny Ludlum
STEEL CORPORATION
BRACKENRIDGE, PENNSYLVANIA

A-8840 . . . W & D

Why we stress removal of air in design of Traps for DEHYDRATION



Study this chart and see how drying efficiency is increased by traps that discharge air just as efficiently as water of condensation.

In investigating dehydration installations, Webster engineers have discovered that the importance of *free and continuous discharge of air* has not been fully realized.

The presence of air retards the transmission of heat. Therefore it is absolutely necessary that this air be completely discharged before dehydration equipment can function at highest efficiency.

Webster Steam Traps meet the need for prompt, complete and continuous discharge of both air and condensation. Speed up the entire drying process.

With Webster Traps you are serving the war effort by helping to prevent waste of valuable fuel. Heating coils or drum dryers are heated quickly and hold that heat continuously.

All materials used in the construction of Webster Process Steam Traps have been selected for their ability to withstand the severe service involved in handling steam at high pressures.

Webster Steam Traps are easy to repair when long use makes thermostat inoperative. No need to disturb piping. All of the work is done right on the job.

Your nearest Webster Representative will gladly give you the facts about "protected drying" with Webster Steam Traps. Call him today or write us direct for Webster Process Steam Trap Data Book, Bulletin B-1200E.

ARMY E NAVY

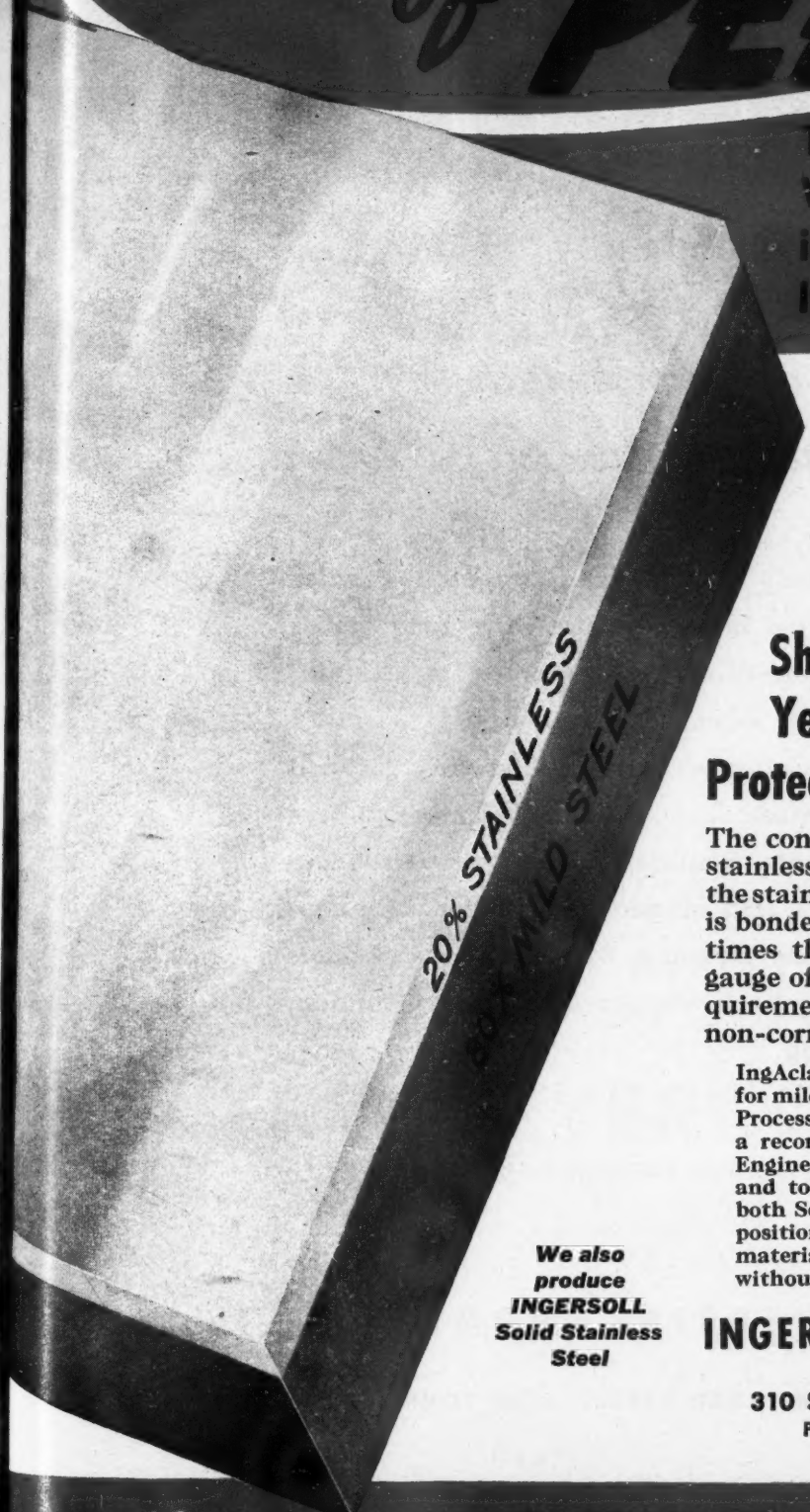
Webster
Steam Heating

WARREN WEBSTER & COMPANY, CAMDEN, N. J., EST. 1888

Representatives in principal U. S. cities : : : In Canada, Darling Brothers, Ltd., Montreal

To Help You Plan Now for the Competitive Days of PEACE!

The Stainless Equipment You Will Need Will be Lowered in Cost by the Use of IngAclad Stainless-Clad Steel



When Peace comes, this Borg-Warner Product, proved by more than 10 years in actual service, will again be ready to serve you, as it is today serving so many wartime needs.

Sharply Reduces Material Cost Yet Gives Perfect Stainless Protection on the Side that is Used!

The contact side of IngAclad is fine quality genuine stainless. The cost is naturally much lower because the stainless cladding of each sheet or plate of IngAclad is bonded to a backing of mild steel approximately 4 times the gauge of the stainless metal. Any given gauge of IngAclad, therefore, reduces by 80% the requirement of vital alloys while giving you the finest non-corroding service.

IngAclad is easily fabricated by the same equipment used for mild steel. It meets a wide range of requirements in the Process Industries and is the only Stainless-Clad Steel with a record of more than 10 years in actual service. Our Engineers will be glad to discuss your corrosion problems and to cooperate with your fabricator. As producers of both Solid Stainless and Stainless-Clad Steel, we are in a position to recommend the most economical and practical material for your requirements without prejudice and without obligation.

We also produce INGERSOLL Solid Stainless Steel

INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
310 South Michigan Avenue • Chicago, Illinois
Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.

"A Borg-Warner Product"

INGACLAD
STAINLESS-CLAD STEEL

DUST RECOVERY SYSTEMS

Recognized throughout industry for their outstanding qualities and performance

The high efficiency of Buell (van Tongeren) Powder Collectors, installed in conjunction with spray dryers in the dehydration of many food products, virtually eliminates powder losses in the exhaust.

Buell Powder Collectors specially designed for food processing, are made of special metals to meet all Pure Food requirements. Rounded corners prevent lodgment of material, and hinged construction facilitates take-down for easy cleaning. Buell Powder Collectors have no moving parts, require little or no attention, and will not clog.

WRITE FOR BULLETIN G-842

BUELL ENGINEERING COMPANY, Inc.

SUITE 5000, 8 CEDAR STREET, NEW YORK 5, N. Y.

BUY WAR BONDS AND MAKE THE AXIS BITE THE DUST

IF ALL THE SIGNS IN THE WORLD WERE TAKEN DOWN TONIGHT...

what would happen tomorrow?

Confusion! Disorder! A world without signs would be a world without direction . . . a bewildered humanity.

Signs were the first form of intelligent thought communication after mankind learned to talk. Since that time signs have been a fundamental factor in the development of modern civilization. Everyday life...the activities of government...of industry and commerce...the movements of transportation...the motivation and direction of human endeavor . . . all are directed to an important degree by signs. Signs have told where to go, what to do, warned, protected, informed, commanded—told what and where to buy. Signs save time, energy, money and contribute to a happier, safer, saner, more orderly life.

The information that signs convey . . . commercial and non-commercial . . . is acted upon more surely . . . more promptly...more frequently...by more people...than that provided by any other visual medium of communication.

THE MEYERCORD CO.

The world's largest manufacturers of Decalcomania Signs, Nameplates, Identification, Trademarks, Truck Lettering and Designs, Product and Home Decorations, Tax Stamps and Insignia and Specialties

5323 WEST LAKE STREET • CHICAGO, ILLINOIS

Published to stimulate thoughtful consideration of the importance of signs . . . both commercial and non-commercial . . . as an indispensable source of information and guidance in modern life.

To help keep machine guns from jamming . . .

OUR AIR FORCES used to use machine-gun belts made of fabric with individual slots for each shell to fit into.

While these belts are still all right for ground fighting, they have too much play for dependable operation in the air. This is caused by the fact that fabric will stretch when subjected to the extra strain imposed on it by the sharp climbing, twisting, and diving motions of a plane in action. And because of this stretch or play, fabric belts sometimes failed to seat the shells in accurate firing position.

The result was a jammed machine gun . . . an obvious disadvantage in battle.

Today our air forces use ammunition belts made of metal links with each shell acting as a pin to hold the links firmly together. The picture above illustrates the principle with fingers substituted for the actual links.

By manufacturing these finger-like links to precision tolerance, Canco is producing ammunition belts that hold each shell in perfect firing position, thereby greatly reducing the danger of jamming.

Other wartime jobs of ours

Among other products made for battle by Canco, are *complete* torpedoes . . . shell containers . . . hermetically sealed first aid kits . . . portable blood-bank containers . . . parachute-flare containers . . . and many more.

Also in war work are Canco's machine shops . . . long producers of ingenious equipment and tools for the packaging industry. They are now making machine tools so vitally needed to produce weapons of war.

All of these war products require metal —lots of it. That's why metal containers are no longer available for many consumer products. True, we of American Can Company still are making cans for the most essential civilian items, and we are also doing everything possible to develop substitute containers. But with us, as with every other patriotic American manufacturer, the fighting forces must come first.

Stop accidents NOW

—save Manpower for Warpower

Co-operate with the War Production Fund to Conserve Manpower by warning your employees not to take chances.

☆ ☆ **AMERICAN CAN COMPANY** ☆ ☆

230 PARK AVENUE • NEW YORK, N. Y.

Management
—Heart of America's Industrial Progress

In Peace and War, Management Men and Methods Steer Production on a Steady Upward Course

WHEN the Allied armada of 2,000 ships, protected by a vast umbrella of planes, struck the coast of Sicily, Axis leaders once more had reason to wonder how "that decadent, pleasure-loving America" had swung from the manufacture of automobiles, refrigerators and costume jewelry to equipments of war, and had out-produced such mighty plants as the Krupp, the Fiat and the Skoda works — and had done it so quickly.

America at war is in the lead just as it has led a world at peace. Super-performing planes are taking to the air at the present rate of nearly 100,000 per year. Ships, to carry the war to our enemies, slide down the ways at the rate of two a day. Tanks, trucks, guns, ammunition are pouring out of our "peace" plants in far greater volume than the entire Axis effort can possibly equal. War expenditures in 1943 alone will reach the staggering figure of approximately $83,000,000,000 — an amount equal to our entire national income for 1929. Added to this is the rock-bottom output of essential civilian goods — a very considerable item.

This unprecedented production is taking place while some 9,000,000 men and women, those physically best equipped, have been called to the armed forces. Many of them were taken from industry, and their loss could be repaired only by more efficient equipment and more effective methods.

Rigorous training programs had to be superimposed upon many other abnormal problems facing industry in its high-speed conversion from stoves to boats; from printing machines to guns; from automobiles to airplane engines; from fishing tackle to bomb sights.

This phenomenal task was further complicated by the need for rapid expansion. A modest machine tool industry had to be expanded to handle a volume many times its normal capacity. Steel production had to be increased by 20%, and that of aluminum and magnesium multiplied over and over. From almost nil, the demand for high octane gasoline soared to unbelievable quantities. The creation of synthetic rubber and electronic industries was necessary almost overnight.

Who deserves credit for these accomplishments? All industry! The engineers, chemists, designers, skilled workers, common laborers. But over and above all it belongs to *management.*

In industry it is mandatory to have a directive force to co-ordinate the efforts of men in the use of materials and the application of power toward the production of goods and services. The application of this directive force is the function of management, and only because we had today's kind of management were we able to transform ourselves, almost overnight, from a peace-loving nation to the world's greatest producer of implements of war. As a nation, we had been preparing for a long time to play our part in world affairs. This preparation, certainly not planned for today's objectives but none the less effective, began some four decades ago.

With the advent of the twentieth century, the character of industry in the United States, and, therefore, the character of American living, began to change. Scientific management was born. Frederick W. Taylor brought into focus and showed how to use effectively those processes and procedures upon which our present-day mass production is based. He was followed by Harrington Emerson, who made the industrial world acquainted with efficiency in manufacture and the remarkable progress to be gained therefrom in the field of production, with its consequent price reductions and wider distribution of industry's products. There followed, in industry, an alert management, a capable management, a management with vision. Without it, the work of Taylor and Emerson would have gone for naught.

It is because of this early work of management — and the extraordinary developments it produced — that the country as a whole, and particularly those employed in industry, were not over-awed by the seemingly impossible job of quick conversion to all-out war production. But let us look back four decades and examine some of those preparatory accomplishments which have proven so vital to the progress and welfare of the nation.

From 1900 to 1939 (the last pre-war year), total employment of all kinds increased 52 per cent; in the manufacturing industries alone the increase was 84 per cent. *The nation became definitely industrial.*

In 1900 the average wage earner was able to spend only 20.2 per cent of his income for things other than necessities; in 1930 his buying power for non-essentials had increased to 34.8 per cent. *The average man acquired confidence in what industry could do.*

In 1900 the average work week was 56 hours; in 1930 it was 48 hours. *The burden of production was being transferred from man to machine.*

In 1939 the United States possessed 30 per cent of the world's railroads, 72 per cent of its automobiles, 49 per cent of its telephones. *The nation's production equipment had grown to formidable proportions.*

In 1939 nearly half of the families in the United States owned their own homes, 64 million individuals carried life insurance policies and 45 million had savings accounts. National income had increased 300 per cent from 1900 and during the same period the proportion of national income paid out in salaries and wages increased from 58 to 70 per cent. And in less than this period (1914–1939) the purchasing power of the wage rate increased by 60 per cent. *There had been evolved the kind of living for which men will work — and fight.*

Since 1900, factories increased their output of goods from $11,000,000,000 to $60,000,000,000 in 1939. This increase of nearly 450 per cent was accomplished while the country's population rose only 60 per cent. In this same span of years, technological developments and improvements in methods had

increased the value added by manufacture per wage earner by 200 per cent, and the horsepower per factory worker had been multiplied by 2½. *The nation's production plant was ready to assume its gigantic wartime job.*

During this period of industrial and national evolution, management itself had changed. Prior to the advent of scientific management, our goods and services were the product of several kinds of directive activities, varying from the strictly paternalistic to the ruthless. There was little conception of the responsibility that industry now broadly acknowledges — the responsibility of trusteeship in the interest of stockholders, employees and the public — specifically; in the interest of our national economy — generally. Acceptance of this stewardship is acceptance, also, of the belief that, in the long run, no industry, and no unit of industry, that does not serve society can live.

Have the actions of management caused the times to change? Or has an alert management been successful only because it has changed with the times? Certainly, the industrial concern of 1900 would not thrive under the conditions of today. Just as certainly the new things that industry has in store for a waiting postwar world will have a far-reaching effect upon the times.

Management today seldom owns the factory or the business it manages. It is hired to perform the coordinating, directive functions. It is free to change — of itself, or with the times. Management therefore exercises its power through leadership in executing ideas . . . not through ownership.

This is the fourteenth of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.

Good management can be sustained only in an environment sympathetic to its aims. It has an undeniable obligation to society, because it must be a compatible part of the social structure or be rejected by that structure as a whole.

An environment sympathetic to its aims means, also, that industry, in the very serious reconstruction period ahead, will not be at full effectiveness if it is subjected to attacks by government no matter what the underlying reasons may be — over-zealous devotion to a cause, lack of understanding or just plain politics. It was to industry — to industrial management — that the government turned when our existence as a free nation was threatened; it is to industrial management that government must turn in order to win the peace.

This statement is made in the sincere conviction that what has made America strong is industry's ability to produce consistently more and more goods and services for more and more people. It is only by actually creating them that we built up our stockpiles of the necessities of life. And it is only by creating them that we can have more of those things that make life worth while. These become available to more people as industry succeeds in getting greater output of goods and services for a given input of human energy, materials and power.

And what of the physical jobs ahead? In this country alone, there will be an immense demand upon industry to supply the things people have been unable to purchase during the war. Today the nation is wearing out not only its automobiles, refrigerators, vacuum cleaners and radios, but its very houses, its roads, railroads, and airline equipment. It is saving its money while whetting its appetite. Truly, the calls the American people will make upon industry in the postwar period will be many and insistent.

This demand can be viewed in another light. Economists say there will be 56,000,000 persons seeking gainful employment after the war. The Committee for Economic Development has estimated that $140,000,000,000 worth of goods and services will be required each year for those people. Compare that with our actual output of $97,000,000,000 worth of goods and services in 1940 when gainful employment was 46,000,000.

These future jobs will be done if industry's management is not too much hampered by government management. Management in industry performs its function in the field of *doing* things. Management in government performs its function in the field of *regulating* things. The best cooperation of the two kinds of management will be necessary in the postwar period. Certainly, too much of the regulatory kind will interfere seriously with the kind that does things.

Industrial management must improve, too. If it is too selfish, if it does not recognize definitely the trusteeship inherent in its job, if it does not understand and live up to its social responsibilities, then it will be risking all for which we are fighting. The following suggestions are made to indicate the direction that management's self-improvement can take.

Evolution in management has been too slow in some respects. Management in industry has been too prone to see the advantages in technological development while being blind to its evils. Looking at industry and social progress as a whole, there can be no doubt as to the value of technological improvement. It creates jobs. It elevates the standard of living. But that economic fact is of no satisfaction to the individual who loses his job because a new machine or a new method required one less man. By and large, this is an evil that management can do something about.

Management has been too careless of its opportunities with regard to labor. On that account the pendulum of social readjustment has swung too far. Labor has been given extensive privilege without corresponding responsibility.

Industrial management has been too slow to abandon its policy of letting the buyer beware. As a result of this, industry today is over-regulated.

Management has been too slow in recognizing its responsibility to promote the economic philosophy that a society cannot have for consumption what it does not produce. A companion educational item too long neglected is management's obligation in the field of public relations.

In these years since 1900, industrial management has been growing. Perhaps many of its experiences have been but growing pains. Management has learned, among other things, the absolutely vital need for capital at the right time and in the right amount. It has learned to use some of its earnings as "seed-money" in the introduction of new products and the use of new processes. It has learned to invest more and more in research. It has learned of the interdependence of industry and agriculture. And it has learned much about the eternal triangle of industry, labor and government.

With such a history and such experiences behind it, I have every faith that management is going ahead to even more glorious accomplishments in the winning of the war, and I believe that its peacetime accomplishments to come are beyond the prediction of any of us — even management itself.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor AUGUST, 1943

Planning For After The War

FOR every industry there will be vastly different problems to face at various stages of the war, especially at the end of hostilities in Europe, and later at the close of hostilities with Japan. For industries producing military aircraft and weapons of war, the character of such problems is readily discernible. Some industries obviously face complete shutdown and reconversion to peacetime goods. But what about the food industry?

At one time we had thought of a special issue of FOOD INDUSTRIES to be devoted to the postwar planning problems of the industry in which would be assembled all the information available. The question was: When should such a study be presented? After sounding the views of more than 50 executives in the food processing industry, the problem of correct timing of a postwar issue seems to vary from "month before last" up to six months after the war is over. One manufacturer good naturedly reminds us that certain states have criminal laws to restrain soothsayers, mind readers and fortune tellers. All of which adds up to the conclusion that any special date would be wrong in the minds of a lot of readers. Hence the decision is reached that a piecemeal treatment is more in order than a whole issue devoted to the subject of what to do after the war.

Some of the Highlights

What are the problems to face the food industry after the war ends? In fact, when is the war over for the food industry? Does it end when the shooting stops, or does it end before then? Or does it end long after the end of the wholesale slaughter?

At best the answers can be no more than high-lighted here. Detailed discussions must come in the future.

Here are a few conclusions reached after many months of study:

1. The war will end for many food industries long before the end of hostilities. In fact, for some of them the end appears to be nearly here! It depends on the import shipping situation and how much success the United Nations have in combatting enemy submarines in the North and South Atlantic oceans. If your business depends considerably on the amount of imports of (a) coffee beans, (b) cocoa beans, (c) sugar, (d) tropical fruits, (e) nuts, oil seeds and vegetable oils, (f) other food materials from ports on the Atlantic oceans, the war may in effect be over before you realize it, even if Germany fights on land for another year or more. The number of ships afloat is the key to the import situation, and recent reports indicate that nearly normal rates of imports of coffee and cocoa beans are reaching the United States, though normal stocks may not yet have been accumulated.

The end of the war as far as sucrose is concerned has, unfortunately, been deferred to the extent of the loss of the production of sweeteners derived from corn as a result of the recent corn industry shutdown. Sucrose supply has thus been tightened by many millions of pounds. So the war can't end as soon for all sugars as it would have ended had the farmers sold corn freely instead of hoarding it.

2. But the war will not end for many other food industries until long after the fighting stops. Because of the need to aid in rehabilitation of most of the captive nations, the demands for processed as well as unprocessed foods will increase with every military advance we are able to make in Europe. The greater the success of our armies, the greater the need for food for liberated people. Much of this demand will be for the highest value foods we can produce—protein foods and high-vitamin content foods.

The timetable of the additional demand for processed foods is not yet released for publication. Those who have seen it are staggered by its enormity and are appalled by the relatively meager resources available for so vast a human need for food. Roughly 135,000,000 people are captives.

3. A military setback to the armed forces of the United Nations, especially a comeback by German U-boats, would be a determining factor in the timing of both the two foregoing major categories.

A German collapse would bring a sudden unprecedented demand for food, whereas an important Allied setback would defer the demand until we could recover the lost ground or overcome the new threat. Perhaps the recent events in Italy will have the former effect.

Your Plans Must Be Ready

All of this is fundamental to planning for the food future. None of it is visionary, nor even bordering on

fortune telling. It is only a common-sense, realistic approach to tomorrow's problems. To the food manufacturer it is not enough to be prepared to take advantage of any breaks for his own profit. He must be ready with carefully laid plans for helping to save civilization, even if it be no more than telling his own customers why we must share our diminished food supplies with liberated peoples.

The non-German peoples of Europe must be kept alive, or a German military defeat can prove to be a German victory.

L. V. Burton EDITOR

The Talk of the Industry

• CHESTER C. DAVIS deserves nationwide acclaim for his Arnold von Winkelried play of resigning his job as Food Administrator to force action. The nation loses, however, a very capable administrator who knows his agriculture. A few more equally courageous resignations would do much to compel the Administration to rationalize its present unbusinesslike organization. Responsibility without commensurate authority will never work. When men are drafted into government jobs they should first insist on a written statement of their responsibility and authority, and if the two do not match the most patriotic thing the individual can do is to decline the appointment for that very definite reason. Or if, as appears to have been the unhappy experience of Chester C. Davis, the requisite authority is promised and later denied, he should resign from the job.

Chester Davis is a real hero.

• ONE feature of having an ex-Congressman as an Administrator, like Prentiss Brown of OPA, is that he knows a few stunts unlikely to occur to a business man without Congressional experience. For instance, when he first assumed office he wanted to get rid of a flock of young lawyers and theorists totally lacking in business experience who seemed to be there by virtue of a subterranean connection with the invisible, anonymous or unofficial group in the White House. How he did it, as generally known in Washington, was to give a list of unwanted names to the Truman Committee of the Senate, a committee that investigates the conduct of the war. Then the boys were quietly tipped off that the Truman Committee would give them the works if they were ever summoned before it. In fact, it is said they were promised a terrific going over. The net result was a wholesale exodus from OPA, not enough to satisfy everybody but at least a good start.

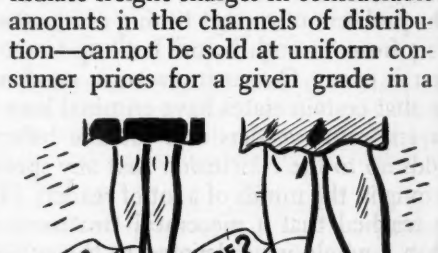
A somewhat comparable technic may be at the base of the recent Wallace-Jones controversy. Never forget that Jesse Jones has taken the rap on several occasions for decisions made higher up. Furthermore, he is a very capable business man who struggled up from poverty. In his own words, "I was raised skimpy." He insists on getting value received for his own or for government funds which are entrusted to him.

On the other hand, there is Mr. Wallace, to whom money is not a reality, who would distribute largesse from the U. S. Treasury with a lavish hand in furtherance of a good-neighbor policy in Latin America, as a part of economic warfare. But Mr. Jones is chary about U. S. funds and is not favorable to excessive prices for materials bought by inexpert persons.

With a party convention less than a year away and a Vice-President that is not exactly a political asset, how better to facilitate his graceful political exit than by allowing the Chairman of BEW to attack the Chairman of RFC for not playing Santa Claus?

• HERBERT W. PARISIUS, the former Lutheran minister who, for a brief month, was a director of the Food Production Administration when Secretary Claude R. Wickard was first made Food Administrator, has just returned from North Africa, where he has been Chief Agricultural Officer on the staff of Office of Foreign Relief and Rehabilitation Operations. He reports that this year's grain harvest in Tunisia is so good that the provision of food from Allied sources for an extended period of time is regarded now as unlikely. We hope he is correct.

• OPA's DISCONTINUED effort to impose grade labeling on all consumer merchandise has been centered recently on hosiery, instead of hammering away on foods. OPA still insists that price control at consumer levels is impossible without quality grades on labels. Maybe so—we don't profess to know much about hosiery. But we are confident that heavy stuff which costs a lot to distribute—heavy things like cans of food which accumulate freight charges in considerable amounts in the channels of distribution—cannot be sold at uniform consumer prices for a given grade in a given market, which is what OPA seems to be aiming at. Possibly a very light product like a pair of stockings, costing several times the value of a can of food, may yet afford to OPA the equivalent of the camel's head in the Arab's tent.



• CORN Canners Service Bureau gives preliminary acreage reports on sweet corn, as of July 1, showing total acreage only 7 percent higher than in 1942.

But Illinois, Indiana and Ohio report about 15 percent less acreage. On top of that, these states had serious floods at corn planting time. Most of the indicated increased acre-

age comes from Minnesota, Wisconsin, Iowa and Nebraska. Quartermaster buying agents appear to be taking a realistic view of the situation by shading the grade specifications for government allotments for canned corn.

• SACCHARIFICATION of wheat without the use of barley malt is a new and highly significant development coming from the enzyme laboratory of the U. S. Department of Agriculture, through the investigations of Irvin W. Tucker. Sodium sulphite added to a granular wheat flour mash releases the diastase, saccharifying the starch and permitting the gluten to separate in readily collectible form.

• DESPITE Congress' refusal to force a rise in the ceiling on corn, farm animals are beginning to come to market in greater numbers, and the meat scarcity may be relieved somewhat. Fears have been expressed that the glut of animals would exceed the capacity of slaughtering and preservation facilities. A managed economy that does not manage is a poor substitute for the self-regulating profit-and-loss-economy in which most of us grew up.

Sins of OPA

Acting on its own initiative or because of a national food policy, or its absence, OPA has done much harm to many branches of the food industry, some of which may be irreparable, according to the views of those who are closest to the industries immediately concerned. Sugar refining, coffee roasting, wet corn milling and meat packing each has a justifiable gripe over the past mishandling of the situations that affect these industries.

Sugar: OPA and the Bureau of Home Economics, USDA, put out a booklet in 1942 telling consumers that " . . . you really don't need any sugar at all!"

Coffee: OPA's handling of coffee rationing made it inevitable that stale coffee was the only coffee available to consumers in many stores, which is a very sure way of alienating coffee drinkers.

Wet milling of corn: OPA price ceilings on meat and grain have had the effect of shutting down the entire industry at a time when every ounce of its production is needed.

Meat Packing: OPA price ceilings have kept animals on the farm to the end that many small meat packers have been closed down, whereas the number of animals for future slaughter will overburden the facilities of the entire industry when the inevitable glut begins.

Price and ration control by those who do not understand the industries involved, augmenting the inconsistencies of certain existing laws with the realities of the day, make the problems of the food industry far more severe than is necessary.

Further Potential Hungry Mouths

One form of indoor sport is to figure what the United Nations will do about Italy. If that nation is occupied then its people must be fed, clothed, and heated in winter. With a population of 45,000,000 and her principal cities fairly well plastered with bombs, this job would be a sizeable undertaking. Italy is already on extremely short rations, and one guess is that the equivalent of food for 3 to 6 million persons would be demanded and would be the obligation of the United Nations when Italy surrenders.

Another idea of the armchair strategists is that the Allies occupy only Sicily, Sardinia and Corsica and from these island bases continue to bomb military objectives on both coasts of Italy and the south coast of France, in the meantime allowing the Italians to subsist as best they can. But, surrender they inevitably must, and thereby become an economic liability to the United Nations instead of to Germany. If Italian armies were ultimately demobilized, perhaps Italy could feed itself, but we must face the necessity of partially feeding an enemy nation before we can help feed liberated countries.

Erratum

S. B. Bledsoe, who was quoted in the July issue of FOOD INDUSTRIES, was erroneously cited as an assistant to the

Hors d'Oeuvres

• Recent developments in the European war theater forecast big new business for one food industry. Italy apparently will soon be ours to have and to feed, so the spaghetti manufacturers better get set to turn out a lot of extra yardage.

• *When the recent flood waters swirled at window level around homes in West Terre Haute, the milkman came through —riding an amphibian jeep. No matter what the predicament, you can always depend on the baby blitz buggy.*

• Although sweets cause a temporary throat "thirst," they really act as thirst preventers in that they help the body to burn up its fats for energy without causing undue dehydration. And for this reason the Quartermaster Corps has developed a new hard-candy lifeboat ration. So you can add another item to the list of things about which you have been wrong all your life.

• *Facing wartime disaster in his roadside restaurant business because of gas rationing, Howard Johnson has gone in for feeding workers at war plants on a big scale. And he is expanding his activities to schools and colleges engaged in the government's educational program. You can't keep a good manager down.*

• A new growth-stimulating factor, called "X" pending further identification, has been found in milk. Finding more food value in milk is a little like gilding the lily.

• *In North Africa, there is a doughnut shop on about every corner. The doughnuts, called "swinges", are made by a man who sits at a container of olive oil heated by a wood fire. After shaping the piece of dough, made of flour, water and salt, the Arab sticks his thumb through the middle and deftly turns the dough displaced back into the side of the doughnut. It took an Arab to figure out what to do with the hole in the doughnut.*

• Italian prisoners of war have been used by Houghland Canning Co., Franklin, Ind., to set out tomato plants. For this work they are paid 40 cents a day, to which the government adds a like sum. When this war ends we may have to use the Army to force the prisoners to go home.

• *A popular French restaurant in Washington changed the name of its Vichyssoisse soup to Gaulloise after France fell, and recently changed it again to Giraudoise. If the recipe is as mixed up as French politics, it must be quite a dish.*

• Britain is taking her first steps to guard against milk from tubercular cows. Pasteurizing milk in England has been prevented all these years by a farm bloc. So don't take any more spinach from your British friends about the backward status of society in this country.

• *Because of the feed shortage, a lot of livestock will be marketed in the months ahead, including not only feeders but part of the "capital." So take particular pleasure in the extra meat you eat this year. It will be a nice thing to remember in 1944.* F.K.L.

Secretary of Agriculture. Formerly in that connection, he is now with the Washington bureau of *The New York Times*.

Government Policy On Enrichment

The Food and Drug Administration has promulgated a carefully considered policy on enrichment of foods with vitamins. This policy, published in the *Federal Register* of July 3, is so important that it is reproduced in full elsewhere in this issue. Manufacturers of processed foods who are interested in the future of enrichment will be greatly benefited by a study of this policy statement.

All Bread Enriched— But Not Very Rich

JESSE TAPP, acting as War Food Administration (before his recent resignation), ruled (FDO 1, Amendment 4) on the composition of white bread. All of it shall be enriched as specified under F&DA standards for enriched bread. All white bread shall "contain not more than 4 parts of solids of milk or skim milk to 100 parts of flour." On the same basis, it shall contain not more than 6 parts of sugar per 100, and not over 3 parts of shortening.

In the case of shortening, there is a proviso that any fat or oil in the ingredients, *e.g.*, so-called shortening extenders, shall be considered a part of the shortening. *Ce'st la guerre!*

Break for Food Production

Enough steel was allocated in May-June by WPB under the Controlled Materials Plan to permit production of farm equipment at 80 percent of the 1941 rate in the last half of 1943. It looks like a real break for the food situation.

If Your "Food Industries" Arrives Late

Irregularity in arrival of your copy of FOOD INDUSTRIES is to be regretted. In most cases it is due to delays in the mails. Our own production schedules are much like a railroad timetable and are determined months in advance. We wish it were true that meeting a production schedule were the only factor to be considered in rendering a complete service to our readers. Ours is, however, a manufacturing business and is subject to all the current problems of industry, including delays in delivery service caused by the war.

If you will make reasonable allowance for these uncontrollable delays before entering complaint, it will save two letters in an already overburdened railway mail service.

Cottonseed Oil

In ordinary times the July 1 USDA crop report that this year's harvest of cotton is to be the smallest in 48 years would be bullish economic news. Cotton crops, however, have an important food value, for the seed produced per bale of cotton weighs much more than the fiber. Even short-staple, low-value cotton contributes importantly to the vegetable oil and animal feed supplies, which are now in a wartime shortage.

According to data provided by National Cotton Seed Products Association, of Memphis, Tenn., there is produced an average of nearly 900 lb. of cottonseed per 500-lb. bale of lint cotton. Actually, the 900-lb. figure should be 861 lb., but 900 lb. is generally used for easy figuring. Seed from the cotton to make one bale gives an average yield of:

Cottonseed oil	140 lb.
Cottonseed cake or meal	400 lb.
Cottonseed hulls	240 lb.
Cottonseed linters	81 lb.

Though this year's acreage is 5.6 percent less than that of 1942, the crop yield is not forecast. But it appears that this important source of edible oil is unlikely to keep up to past records.

Steenbock Patent Invalidated

The famous patent, No. 1,680,818, granted to Dr. Harry Steenbock of the University of Wisconsin on Aug. 14, 1928, and assigned to Wisconsin Alumni Research Foundation was declared invalid by the Federal Circuit Court of Appeals in San Francisco on July 1. The case had been litigated in the District Court in Los Angeles, in which it had been held that the Steenbock patent was valid and was infringed by Vitamin Technologists, Inc. But on appeal by the latter, the circuit court held in effect that this was a patent on a natural process and was invalid.

"If the patent be valid, it is thus seen that the farmer infringes when he exposes his cut alfalfa to the ultraviolet rays of the sun long enough to make it antirachitic. So also the long previously established practice of the radiation of milk by the mercury-vapor lamp would infringe the monopoly of the Steenbock patent because, admittedly, it would produce in milk vitamin D."

Thus, two years before its expiration the patent has been invalidated. Whether the Foundation will attempt to carry the case to the U. S. Supreme Court is not apparent at the present time. Foreign patents, licenses and royalties to the extent of more than $7,000,000 have been paid on the invention, and if previous licensees attempt to recover them there will be plenty of excitement. One hazards a guess that the end is not yet.

The next moves, if any, will be awaited with interest.

Papa Knows Best

War Food Administrator No. 2, Chester C. Davis, pointed out "two main causes" why he should quit: (1) ". . . a public responsibility while the authority . . . is being exercised elsewhere;" (2) " . . . I do not believe such subsidies will be effective in controlling inflation unless they are accompanied here as they are in England by current tax and savings programs that drain off excess buying power, and by tight control and management of the food supply. We do not have in this country anything approaching these conditions."

President Roosevelt's lengthy answer is illuminating, especially these statements: "I am sure that you will agree with me that effective teamwork is absolutely necessary." . . . "I am truly sorry that you feel unable to continue as food administrator subject to the coordinated controls which I have established and which I believe are essential for the coordinated functioning of our war effort."

Enters now War Food Administrator No. 3, Judge Marvin H. Jones, amiable, likeable, administratively inexperienced, and willing to stand for almost anything. It's the same old setup, except that No. 3 has a place on the War Mobilization Committee and War Production Board, something denied to No. 2.

But papa knows what's best.

What Hot Springs Conference Means to Food Processors

By PAUL H. APPLEBY,* Under Secretary of Agriculture.

It promises big future and much more important place in scheme of world affairs for those who produce, process and distribute foods. The author interprets its long-range significance

PAUL H. APPLEBY

THE recent United Nations Conference on Food and Agriculture was, I believe, highly significant. If it was significant, it surely had special significance for the food industries.

A general objective constantly referred to was "an expanding world economy." That means more business. And since the Conference had for its field the subject of food, it means in particular more business in food. More business in food means more business in the food industries.

For the fact is that a large percentage of our food is processed in one way or another, at least in countries that are well developed industrially. Wheat is processed into flour and bread; fluid milk is pasteurized and bottled; fresh meats, although not processed, are kept fresh through an elaborate cold-storage system; immense quantities of vegetables and fruits are canned or frozen—and perhaps in the future large quantities will be dehydrated.

Expansion in the production and consumption of food was a major objective of the Conference, involved throughout the discussions and recommendations. Before getting into the question of what the practical effect will be, and when, we should explore the discussions and recommendations further.

The public has readily realized the problem presented by the reconversion of industry from making war products to making peace products. The jobs of millions depend upon that process. And the utilization of the world's great new capacity to produce, so dramatically shown during the war, holds out an alluring hope for higher standards of living. If old ways are followed, however, nations, in desperate efforts to meet their single situations, may do things that are restrictive, not expansive.

The Food Conference was in part a recognition of the fact that agriculture has a problem of conversion similar to that of industry—a similar problem of finding effective, enduring markets for the expanded production of wartime, a similar problem of using its still greater capacity to produce in peacetime as its continuing contribution to a rising standard of living.

* A member of the U. S. delegation to the Hot Springs International Food Conference.

Harris & Ewing

United States delegates to the United Nations Food Conference held in Hot Springs in May. Standing (left to right) are the author of this article, Paul H. Appleby, Under Secretary of Agriculture; W. L. Clayton, Assistant Secretary of Commerce; and Dr. Thomas Parran, Surgeon General, U. S. Public Health Service. Seated are Murray D. Lincoln, executive secretary of the Ohio Farm Bureau Federation; Miss Josephine Schain; and Marvin Jones, chairman, and now War Food Administrator.

Three Basic Facts

The starting point for the Conference, the starting point for any discussion of food, is this basic fact: *This long after the industrial revolution, two-thirds of the people of the world are normally engaged in producing food, and two-thirds of the people of the world do not have enough to eat.*

The Food Conference went on to two other basic facts:

First of these is this: We now know what foods are necessary to proper nutrition, and how fundamentally important is proper nutrition. Dr. Tom Spies of Birmingham, Ala., with his fine Southern background as one of the world's distinguished figures in the field of nutrition, has come to the conclusion that there is no such thing as human "trash." Malnutrition is one of the two basic factors in contributing to unsuccessful living. We can well couple with his conclusion that of the modern psychologists, that with a few

exceptions which may be regarded rather as accidents, all babies are "normal," full of normal potentialities.

We know that now only ignorance or hypocrisy assumes equality of opportunity among people, when only a minority is decently nourished.

The second basic fact proclaimed by the Food Conference is this: We now know how to produce enough to look confidently toward the day when everyone can be well fed. Some countries have much farther to go than others. Some will take much longer than others. But on a world basis, we can produce enough to feed ourselves decently if modern knowledge can be far more widely used.

I think food technologists will agree with this because they know the progress that has been made in production technics. And they will realize that it is a revolutionary idea compared with the economic thinking of the past.

Proceeding from these facts, the Conference concluded that a first duty of governments is to make it possible for more farmers everywhere to take more advantage of the possibilities of up-to-date technology, in other words, to farm more efficiently. They could at the least thus be enabled to produce more for their own households. For larger gains, the Conference declared that the economic solution to the problem of freedom from want of food is the solution of the problem of freedom from want in general; finding ways in which more people in all fields can, with modern technology, produce more, and exchange their increased production for more food and more of other things.

In other words, there must be stimulation of enterprise, the spread of technological efficiency and reduction in barriers to trade. The barriers to opportunity must be progressively broken down—the barriers that shut off markets for agricultural products and force farmers to hold down production when every farmer's instinct is to produce all the earth will yield —the barriers that deny work to unemployed men—the barriers that prevent human beings from getting the food they need. These are the things essential to the expanding world economy which is essential to the progressive achievement of freedom from want.

These things are a matter of common knowledge among those who have had to look at the matter in broad terms. The Food Conference was called in recognition of these things, and early discovered that responsible and thoughtful persons everywhere have come to quite similar conclusions.

Food for Everyone, Everywhere

The Conference therefore proclaimed these facts about food, nutrition and agriculture. It asserted that *the world can and should and must* be adequately fed. It must start on the road to this achievement for everyone, everywhere. The Conference asked that all the nations pledge their own peoples and pledge each other to assume a new responsibility to see that their peoples are better fed. It recommended establishment of a permanent organization to work toward achievement of the objectives set forth in more than thirty sets of recommendations.

Here are some of the recommendations, just as examples:

This dinner table scene illustrates the freedom-from-want, food-for-everyone-everywhere goal set for the postwar period by the United Nations Food Conference.

There is need for special measures to see that children, mothers, and the very poor are better nourished.

Many farmers—in some areas, practically all farmers—need more land, more capital, more equipment and more knowledge if they are to use modern production methods and get from the soil the kinds of products, and the amounts, that it should be producing.

Much larger quantities of vegetables, fruits, dairy products, eggs and meat must be produced if people are to be adequately nourished by modern standards.

Certain other crops—wheat, for example—should, for the long pull, be concentrated in those areas of the world best suited to growing them. These crops can be stored and shipped easily, whereas many of the more perishable crops cannot be. Such an arrangement should go a long way to relieve the problem of so-called surpluses faced by the natural single-crop areas in the past decade or so.

Conservation farming should be greatly extended, especially in places where people have to mine the soil for enough fuel-supplying foods to keep life burning in their bodies.

Farming, the world's most basic industry, should have access to credit in amounts and on terms suited to its needs; it should be protected from the effects of extreme inflation and deflation and have security of tenure, ample technical assistance and reasonable returns.

Research and education must be actively encouraged and extended if production is to keep pace with changing needs and conditions and farmers are to make greater use of modern technology.

World Economy Must Expand

World-wide industrial expansion is necessary not only for its own sake but to back up expanded farm production with adequate purchasing power, and to provide opportunities for people now crowded too closely on the land to make a decent livelihood.

There must be stable international monetary and economic arrangements so that the world's business can be carried on in an orderly fashion.

Arrangements must be made that will permit an orderly and friendly international trade between nations.

Numerous recommendations had to do with enlargement or transporting, marketing, storage and processing facilities. In some countries these are highly developed. In others they are almost totally lacking, and they are vitally necessary to an expanding world economy that puts fundamental emphasis on better nutrition.

There Will Be No Santa Claus

There was not the least thought that basic world problems could be solved

by electing any nation to the role of Santa Claus. This was true not merely because *all* peoples are properly proud, wanting to perform in keeping with their worth; it was true because the delegates were hardheaded and realistic. They knew that Santa Claus really could do very little to meet a need so great. They knew, and asserted, that by far the greater part of what needs doing, nations must do within and for themselves. But they also declared that national policies which support each other will greatly magnify the effect of what single nations might do, acting alone. Their premise was that *working together is the best way to help each other.*

Here you see typified one of the basic facts upon which the Food Conference based its program—two-thirds of the people of the world do not have enough to eat.

The purpose was to set up new popular expectations with respect to policy. I should like to emphasize my belief that agreements that are only agreements of sentiment are important and do affect action. The sentiment for national self-sufficiency after the last war, for example, surely affected the course of history adversely. If now we have an expectation everywhere that there will be expansive efforts in the field of business and trade, surely that expectation will encourage more such efforts. And setting up new expectations in everyone's mind that people will be better nourished surely will affect public and business policy and individual action.

Those are the expectations we hope will result from the Conference. Instead of preparing for an era of pessimism such as followed the last war, when nations more and more walled themselves off from each other until another conflict became inevitable, we hope men's minds can begin now to turn to what can be done by using the vast productive resources of the world to make life better in every nation, to attain new standards of health for people everywhere.

I have said that a central thought was emphasis on an expanding world economy. The modern economy developed as it did, succeeded as it did, because it operated in an expanding world. Intelligent business men and economists everywhere are agreed that prosperity is dependent on continuing expansion of the economy, and that the opportunity for expansion is to be found in measures which progressively will raise the standard of living of the masses the world around. That is the Freedom from Want program. It can be achieved, as freedom from fear can be achieved, only by substituting for the excess of international competition from which the world is suffering, international cooperation. The Conference on Food and Agriculture was a highly successful beginning in the development of that cooperation.

Now how can these purposes be achieved in postwar years?

The Conference asked each nation to pledge its own people and all of the nations to pledge each other that they would assume a new responsibility for seeing that their peoples are better fed. It was felt that such pledges would lead to considerable action in support of the objective. In effect, they would make expanded production and consumption definitely a part of national policies the world over.

The Conference also asked that a permanent international organization be set up to further Conference objectives and to develop them realistically in accordance with circumstances. And it asked that the nations make periodic reports to the international organization showing what has been achieved in production and consumption.

I believe that these things will contribute a great deal to the creation of a world much more nutrition-minded than it ever has been in the past. I believe that this is an important underwriting of larger markets for producers, processors and handlers of food.

Need for Improved Technology

There will be other, auxiliary influences. Believing that farmers should be properly paid, the Conference saw increased production of food to turn chiefly on improved technology and industrial expansion. Improved technology as a contribution to lower farm costs making wider consumption possible has its counterpart in improved technology in processing and marketing. The Conference saw its goals as involving generally higher standards of living, and with that spirit it sharpened no axes for any victims. It said things about processing and marketing which business men themselves say, no more. It said that improvements in efficiency always are possible in all fields, that real abundance can come only from increased efficiency. This has long been the thesis of business men who know what efficient practices mean. It said that reductions in cost must come about either through reducing the services demanded or rendered or through the slow and painstaking way of improving operating efficiency. It pointed out that there is some scope for reduction of marketing costs by the elimination of nonessential services but recognized that most of the links in the chain from producer to consumer are essential, and that in many areas of the world there are as yet not nearly enough links.

Better Nutrition Endorsed

Recent tendencies toward assisting the consumer in more intelligent selection of foods will be accelerated by the Conference, which went on record as endorsing the extension and improvement of standards of nutrient content and purity of foods, and the formulation and adoption of international standards of this kind.

The Conference made a number of other specific recommendations in regard to marketing, processing and distribution, some of which will be far more important in other countries than in the United States. It is hoped, for example, that as a result of these recommendations, marketing facilities can be built up in some of the less highly

(*Turn to page 118*)

Two Methods for Dehydrating Citrus Juices

By RICHARD HOLZCKER, Lake Wales, Fla.

The progress made in spray drying and in sublimation of moisture from the frozen state is described here by a man who acts as consulting engineer on these two methods for producing dehydrated citrus juices

Dehydrated orange juice crystals made in the F. J. Stokes Machine Co. pilot plant are shown at center, with equivalent quantity of fresh fruit at left and the dehydrated juice at right. The Stokes pilot plant is shown on opposite page.

FOR well over 20 years various investigators have reported means by which citrus juices could be concentrated, and even completely dried. The Florida Citrus Commission, however, considered it advisable to investigate the possibility of complete dehydration of such juices in the light of today's better understanding of the problems involved and the broad advances made in the technological development of food dehydration. The present status of citrus juice concentration has recently been fully described (FOOD INDUSTRIES, May, June, 1943), and this article, therefore, shall be limited to a brief outline of methods which we found feasible to completely dry orange juice. Orange juice was selected for the experimental work because it is the most difficult to process.

The flavor of citrus juice will deteriorate rapidly once the juice is removed from the whole fruit. Enzyme activity and oxidation are the principal reasons. But the application of heat, particularly when used simultaneously with reduced pressure, is also very destructive, if for no other reason than rapid evaporation of flavoring esters. Reintroduction of these volatile constituents has not proved practicable.

Dehydration Protects Juice

It is evident that when a material of this type is completely dried (to less than 1 percent moisture), enzyme activity will cease and vitamin destruction will be held to insignificant levels, but the final product cannot be better than the raw material from which it is made.

The usual precautions regarding the selection of fruit, methods of juice extraction, sanitation within the plant, and so forth, are as necessary in the drying of fruit juices as in their canning or concentration. The shorter the time interval from the citrus tree to the processing plant, and from the storage bins to the final product, the higher will be the retention of fresh fruit flavor and vitamins.

Spray drying has been used for years in the preparation of dehydrated citrus products. Fruit sugars are very hygroscopic, and, in the parlance of spray drying engineers, not dryable. Foreign substances must be added to the juice prior to drying to overcome this limitation. Many materials have been proposed for this purpose, but because of the assumption that the powder would be reconstituted for beverage purposes we limited our work to the use of corn sirup solids. Other materials may be very suitable, but they have a tendency either to mask fruit flavor or to effect the consistency of the reconstituted juice disadvantageously. Glucose seems to assist in fixing fruit flavors. Certain types of corn sirup solids will yield a stable product when they make up as low as 65 percent of the total solids, but usually the percentage of conditioner must be higher.

Our considerations indicate that to avoid flavor loss and vitamin destruction, spray drying should preferably be accomplished at low temperatures and normal pressures; and because much flavor is contained in the juice sacs (pulp), the nozzle construction should be such that a high percentage of pulp will not interfere. The accompanying sketch gives an outline of the type of equipment used. Its particular advantages are flexibility in operation and ease of cleaning, in addition to meeting the primary requirements set forth above. The nozzle opening is large; air velocity and temperature may be readily varied; and the ratio of air volume to liquid feed can always be controlled to meet operating variations. Juice and a relatively small amount of air are fed through concentric jets into a high-velocity air stream. This current of air was heated to 100 to 125 deg. F., and its speed varied from 6,000 to 8,000 ft. per minute. The atomizing air pressure was held to 35 to 50 lb. per square inch. Under these conditions, initial drying was accomplished in from 4½ to 6 ft. of travel, and the following data are presented as average from a great number of runs:

	Orange juice	Powder
Citrus solids, percent	12.1	25
Corn sirup solids, percent		75
Acidity, as citric percent	1.05	0.27
Ascorbic acid, liquid	66.35 mg. per 100 c.c.	
dry basis	109.6 I.U. per g.	26.6 I.U. per g.

Although the percentage of acid is rather low, the reconstituted juice had a very pleasant taste and a good color; the flavor could be improved by the addition of a small percentage of lime juice prior to processing. A sample of this powder has been under storage tests for about six months and no significant changes have been observed. The required addition of conditioners naturally makes such powders very bulky. Compression into tablets is impracticable because it retards rehydration to such an extent that the tablets form a gummy mass which is difficult to bring into complete solution.

Desiccation from Frozen State

Undoubtedly the distribution of citrus fruits, or rather their nutritive values, could be broadened materially

were it possible to dry the juices without the addition of conditioners and without loss of flavor and food values. The risks in distribution because of the perishable nature of fruit would be eliminated, and shipping weight would be reduced from 100 lb. to about 5 lb. It now seems that adaptation of methods used in the dehydration of pharmaceutical and biological preparations, particularly the drying of blood plasma, have made that possible. The "desiccation from the frozen state" is a process which bids for wide acceptance in the dehydration of sensitive food products. While the fruit juice or other material is in a frozen state, chemical change and intermolecular reaction are prevented, volatile constituents are retained and the multiplication of microorganisms and their detrimental effect eliminated. This drying method is as well suited to the concentration of orange juice as to its complete dehydration. Admittedly, the cost of producing a concentrated juice by desiccation would be higher than by methods now used, but the higher cost could be readily outweighed by the higher quality of the product. The cost "per pound of water removed" in the complete dehydration of orange juice has been conservatively estimated at less than 3 cents. Pilot plant experience now indicates that this figure may be reduced materially.

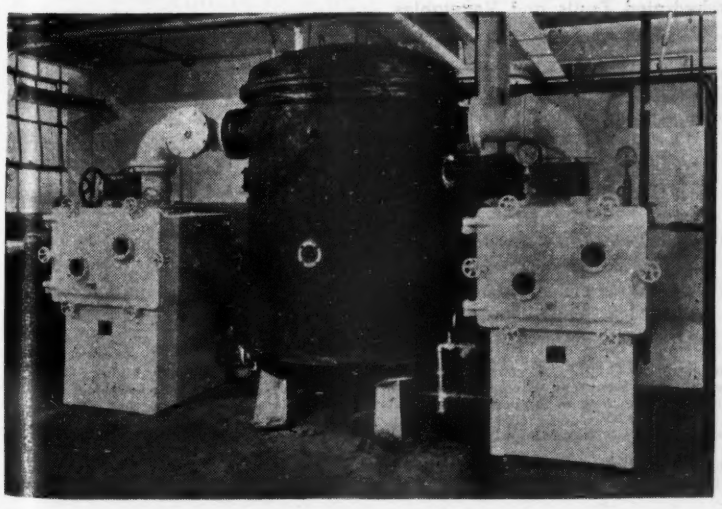
Heating Hastens Process

Judging from occasional publicity items which have appeared in the press, several investigators have been working on this problem. Basically, their methods are alike; they differ in engineering detail. A general, step-by-step description of the process may be given as follows: Properly prepared orange juice is charged into trays and these are then placed in vacuum chambers, which may be of standard shelf-drier design. After the system has been closed, vacuum is gradually applied, and by simultaneous circulation of a coolant through the jackets, or simply by evaporative cooling, the liquid will be frozen. Evacuation continues until very high vacua are reached, say, 5 mm. of mercury or less. During evaporation, controlled heating may be used to hasten drying.

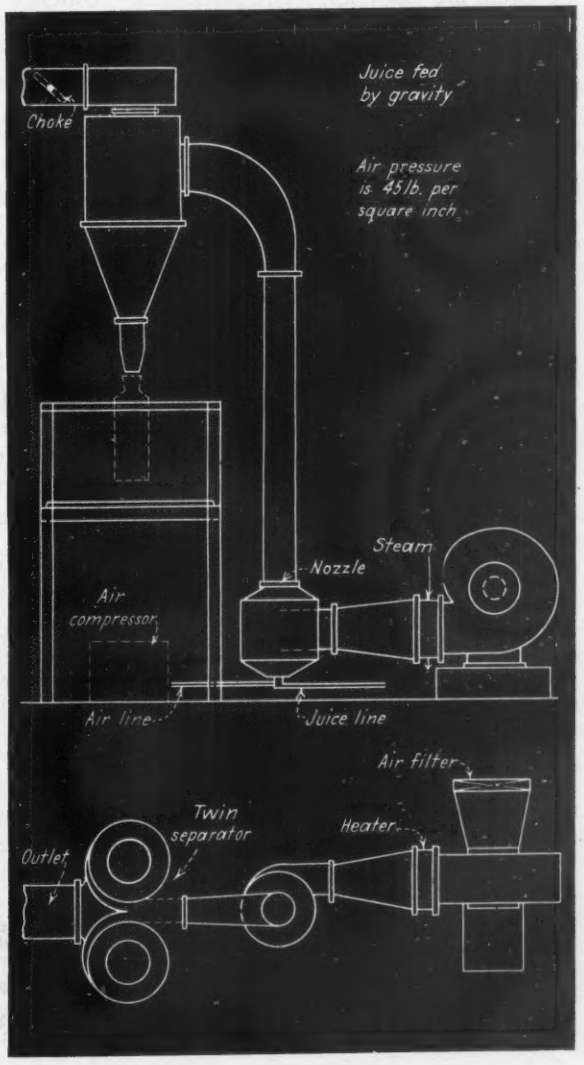
Sources of heat and the means of application are the most significant differences in the various systems proposed. (These proposals vary from hot water and steam circulation through the jackets of the chambers to the use of infra-red irradiation or the application of radio-frequency heating.) The vapors are drawn through banks of refrigerated coils or passed over desiccants and the moisture thus removed. Actual drying time has been reported to require from 12 minutes to several hours. Such wide variation can be explained only on the basis of variation in thickness of material in relation to the exposed surface, and this time cycle will vary with the design of the equipment. Although "penetrative" heating may shorten the time required to evaporate the moisture from a given weight of substance, economic considerations will be decisive in the selection of the source of heat and its application.

When the desired degree of dehydration has been reached (about ½ percent residual moisture), the vacuum is broken and the dry orange juice crystals are ready for packaging. The crystalline powder thus obtained will readily rehydrate to a beverage in all respects comparable with freshly extracted orange juice. The color and body of the drink are natural, and there is no significant change in flavor; ascorbic acid losses are about 2 percent. It should be mentioned, however, that the product contains only the natural sugars, acids, minerals, salts, and so forth, and is free from any conditioners or other additions. It is, therefore, hygroscopic, and must be packaged properly to prevent reabsorption of moisture.

Both methods here described promise definite usefulness in the dehydration of citrus juices. Selection of the processing method will depend upon the desired end-use of the product.



Pilot plant at the F. J. Stokes Machine Co. for the production of dehydrated citrus juice by desiccation from the frozen state, using the Lyophile-Cryochem processes.



Outline sketch of the spray-drying equipment used for producing dehydrated citrus juice.

How To Compress Foods

This information has been issued by the Western Regional Research Laboratory of the United States Department of Agriculture as a guide to fruit and vegetable dehydrators

WHEN a ship is loaded with cargo at the rate of 1 ton per 40 cu. ft., the holds are filled and at the same time the ship carries a full weight load. The objective in the compression of dehydrated foods should therefore be 55 to 60 lb. per cubic foot as the block density. This calculated objective takes into account the fact that the finished package is a little less dense than the unpackaged cakes. Investigations have shown that such densities can be attained without loss of quality in the reconstituted product.

Even higher densities are to be preferred if an oxygen-sensitive product is compressed and packaged in a hermetically sealed container. Dehydrated cabbage, carrots and tomato-juice cocktail are examples. The denser the pack, the lower will be the ratio of oxygen in the can to the dry fruit or vegetable.

A further advantage of compression is the diminished tonnage of steel and tin required when cans are used, since doubling the density halves the metal required. The percentage of saving in cans resulting from compression is numerically equal to the percentage of reduction in bulk. (See table, column 9.)

In addition to increased density, rehydration to original size and shape is an objective, with a low percentage of fines or small particles. In tests at the Western Regional Research Laboratory, fines that pass through an 8-mesh screen after rehydration have been kept under 5 percent. Weighed samples of blocks were rehydrated and screen analyses made of the cooked product. The low percentage of fines prevents a mushy texture and maintains palatability equal to that of unpressed, rehydrated products. The table shows the conditions under which fruits and vegetables have been compressed with 5 percent or less of fines. The time required for rehydration is not increased over that required for unpressed foods.

High densities in the pressed block require higher pressure when the dried fruits and vegetables are low in moisture content. Furthermore, with low moisture content any given pressure will produce a higher density and a more cohesive block if the dried product is hot instead of cold. The densities shown in the table were measured on disks ½ to ¾ in. thick. These disks were kept in cans without wrapping while they cooled, with the exception of onions, carrots, beets and rutabagas, which were pressed into 2-lb. blocks 2¼-in. thick and were cooled in a holding press. With onions, beets, rutabagas and carrots, it has been found that blocks tightly wrapped in cellophane, with the wrapping sealed, need not be kept in a press to cool. During the cooling, the densities under such conditions decrease from 61 to 59 lb. per cubic foot for onions and from 62 to 58 lb. for carrots.

Sun-dried apricots, cut and pitted, can be compressed by hand at room temperature to a bulk density of 42 lb. per cubic foot. A pressure of 150 lb. per square inch at room temperature resulted in a block density of 79 lb. per cubic foot. Higher pressures and an elevated temperature are required for high densities when fruit products are dehydrated to as low as 2 or 3 percent moisture content. The table shows data on apple nuggets for which, because of a 2 percent moisture content, a pressure of 450 lb. per square inch and a temperature of 170 deg. F. were required to produce a block density of 64 lb. per cubic foot. At 75 deg. F., 850 lb. of pressure was required to produce a density of 53 lb. per cubic foot.

For the K rations used in the Army, fruit bars with 20 percent moisture and containing glucose are made by extrusion from machines of the sausage-making type on a belt where the bars are cut to length. These machines use a worm screw to force the fruit paste through a tapered nozzle. Determination of a suitable taper for a particular product requires some experimentation. The bars are wrapped after cutting. If they are to be pasteurized, a suitable wrapping consists of a layer of greaseproof paper for use in handling, a cellophane bag that is heat-sealed after insertion of the bar, and a light chipboard box. A typical pasteurized fruit bar packaged in this manner has a density of 80 lb. per cubic foot.

The maximum attainable density of

Compression of Dehydrated Fruits and Vegetables

(Tests conducted at the Western Regional Research Laboratory)

Fruit or vegetable	Moisture (percent)	Temperature of pressing (deg. F.)	Pressure for blocking (lb./sq. in.)	Densities [1]			Approx. contents of packages (lb./5 gal.)	Reduction in bulk [2] (percent)	Equivalent fresh prepared (lb./cu. ft. block)	Dehydrated food for 100 servings [3] (lb.)
				Initial (lb./cu. ft.)	After compression (lb./cu. ft.)	Compression ratio				
Apple nuggets	2	170	450	12.5	64	5.1	12.0	71	620	3.5
Apple nuggets	2	75	850	12.5	53	4.2	12.0	64	510	3.5
Apricot halves	25	75	150	42.0	79	1.9	28.0	44	400	....
Beet cubes	4.1	160	650	25.0	62	2.5	17.0	57	740	3.5
Beet slices	5.7	120	650	12.5	64	5.1	8.0	80	760	3.5
Beet strips	4.2	120	650	15.0	57	3.8	10.0	72	680	3.5
Carrot cubes	5.2	160	650	19.0	62	3.3	17.5	50	620	4.0
Carrot slices	4.8	160	650	6.0	56	9.3	8.0	75	560	4.0
Carrot strips	3.7	160	650	10.5	47	4.5	10.0	62	470	4.0
Onion flakes	3.0	140	650	6.0	61	10.1	12.0	60	610	2.0
Prunes, whole	28.0	75	150	48.0	78	1.6	36.0	27	300	....
Rutabaga slices [4]	6.9	140	850	11.0	59	5.4	12.5	68	620	4.0
Tomatoes, spray-dried juice [5]	4.0	78	1500	30.0	60	2.0	27.0	29	670	2.0

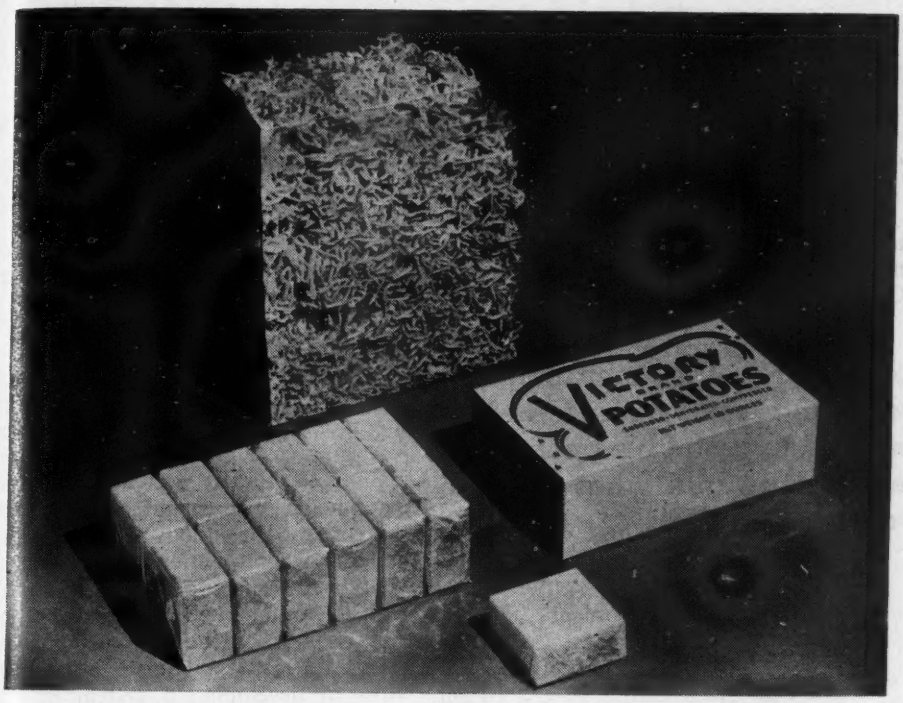
[1] Densities before compression were measured on shaken but unpressed material (Col. 5). Densities of commercial shipments are frequently higher.

[2] The percent reduction in bulk equals the difference between the weights of a 5-gal. can of compressed vegetables and the corresponding weight of the uncompressed vegetable divided by the former weight. In computing the net weights of packages of the compressed foods, allowance is made for 15 percent of unused space in cans and for 5 percent in cartons.

[3] From the War Dept. Tentative Training Manual 10-406, "Dehydrated Foods Cooking Manual," except for figure on tomato juice cocktail, which was obtained from a producer's estimate.

[4] The tentative moisture content of rutabagas is 5 percent, at which blocking will produce a lower density than that found.

[5] Spray-dried tomato juice cocktail is packed 4 lb. per No. 10 (3 qt.) can.



Courtesy Du Pont Co.

A proposed package of compressed dehydrated potatoes is shown at left. Container in background contains the equivalent amount of potatoes before compression. The space saved is approximately 75 percent.

dried fruits and vegetables can be estimated from: (1) Existing analytical data on their pulps, (2) data on the densities of their constituents. For dried peaches the estimated attainable density is about 75 lb. per cubic foot at 20 percent moisture content, or 85 lb. if free from moisture.

Presses and Processes

Hydraulic presses have been used in Germany for the compression of mixed vegetables, herbs, carrots, cabbage and dried sauerkraut. Continuous tile presses are reported to be in use, in which pressure is imparted by two cams acting at different stations in the machine. Knuckle-joint presses are used in the United States to compress hops, and screw presses are in use for compressing dehydrated egg powder. Some free-flowing powdered soups have been smoothly handled in industrial tableting machines on an experimental basis. The latter are not well suited for use in forming blocks of dehydrated vegetables because: (1) The vegetables are not free-flowing, and therefore automatic and uniform charging of the molds cannot be accomplished in typical machines, (2) such tableting machines ordinarily operate at compression ratios of 2 to 1, or less. The compression ratio is the ratio of the volumes of the filled mold before and after compression. It can be computed by dividing the density after compression by that before compression. Column 7 in the table shows such ratios. Press makers must know the compression ratio in order to determine the length of stroke of the ram.

The capacity of a press is usually stated in terms of the total safe working pressure between the platens. Molds may have one cavity or multiple cavities. Dried fruits and vegetables have been formed into 6x3x1-in. blocks. Blocks 2¼ in. thick have been formed, and a brick approximately 6½x4½x2¼ in. with one edge rounded has been proposed, since it lends itself well to packing in standard 5-gal. cans at the rate of 16 blocks per can. Such a block will weigh 2 lb. and can be reconstituted into 50 servings of carrots. Military recipes are in terms of 100 servings for companies, and probably the most suitable blocks should contain weights corresponding to this number of servings. Blocks can also be formed with indented scorings like those on milk chocolate slabs to facilitate breaking the blocks into smaller units of known appropriate weights.

To reduce friction, the surfaces of molds must be very smooth, a condition which can be produced by a surface grinder. It is frequently the practice to follow this by nickel or chromium plating and polishing. The surfaces of new dies must be lubricated with salt-free, moisture-free, edible oils or fats such as commercial hardened shortenings or special edible lubricants. Continuous use of lubricants may be required to reduce the friction as the fruit or vegetable moves by the plunger past the sides of the mold. Friction resulting from unpolished, inadequately lubricated steel surfaces diverts part of the pressure from the foodstuffs to the sides of the mold; thus the effective pressure is decreased at the bottom of the mold, and poor cohesion and a laminated, leafy brick may result.

Sometimes very fine, dried materials, or even powder, are compressed. Examples are soup mixtures and dehydrated tomato juice cocktail. Most dry powders flow readily and uniformly and such conditions are essential in the automatic feeding of presses. Dehydrated soup powders have been processed satisfactorily on industrial tablet-compressing machines. Dried tomato juice of 4 percent moisture content has been readily compressed hydraulically by 1,500 lb. per square inch at room temperature to a density of 60 lb. per cubic foot. The cakes were reconstituted to a 6.5 percent juice simply by beating with an egg beater and then adding boiling water and heating one minute. The dry compressed cakes crush easily.

Dehydrated vegetables of diced, sliced, stripped or flake form yield high-density blocks that readily rehydrate and in which the content of fines is low. Hydraulic presses have been used in obtaining the results shown in the table. The maximum pressure has been maintained for a period, or "dwell," of one minute. Blocking has been effected ordinarily at temperatures from 140 to 160 deg. F. The purpose of an elevated temperature is to produce a pliable state of the vegetable for compression so that it will reach a high density without breaking into small pieces to any considerable extent. Firm blocks of somewhat lower densities have also been produced at ram speeds of 1 to 2 in. per second followed by a "dwell" of 15 seconds.

Fine material passing an 8-mesh screen, caused by compression under the conditions shown in the tabulation, did not exceed 5 percent of the rehydrated vegetables for any form of beets or carrots, or for onions or rutabagas. In general, the cohesion of the blocks was only fair at lower pressures and the same temperatures as those listed in the table. Higher pressures were not required for good cohesion nor were they necessary for adequate compression.

A slight expansion of blocks ½ in. thick occurs in that dimension when they are removed from the hot molds. This expansion is slight because these pieces cool rapidly. An estimate of the time required for cooling thick blocks of carrots in air is afforded by these

(*Turn to page* 130)

This Is What It Costs To Dehydrate Vegetables

By W. D. RAMAGE and C. L. RASMUSSEN, Western Regional Research Laboratory, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture, Albany, Calif.

Part IIA—Processing costs. Since the operating charges are much greater than capital charges in dehydrating food, it is essential to profitable operation to know what these costs are and what factors affect them. Here are helpful facts

THE consideration of operating costs has been divided into two sections: (1) Labor requirements and (2) segregation and analysis of processing costs. The general problems of labor distribution and labor requirements are first discussed. Certain aspects of labor are closely connected to segregation and analysis of costs and are considered further under the latter heading.

Labor Requirements

Labor costs are such an important factor in dehydration that efficient use of labor is essential if reasonable operating costs are to be attained. The number of employees in a dehydration plant is by no means fixed, and preliminary estimates of labor requirements are usually rough approximations because of the large number of factors affecting labor usage. Among these factors are: Type of process; degree of mechanization; efficacy of equipment; effectiveness of plant layout; proper balance between operating steps; condition, variety and grade of raw material; specifications for finished product; labor laws and customs; working conditions; ability and training of employees; method of pay; morale; and operators' individual preferences and policies.

Not all of the above factors can be evaluated in advance. Observations made in canneries and dehydration plants and the opinions of experienced plant operators offer the best method for preliminary study of the subject. The discussion presented herewith has been developed largely on this basis.

Table VI shows the approximate labor distribution in dehydration plants of moderate size, handling about 50 tons per day, unprepared basis, of seven vegetables important in the dehydration program. The trimming, sorting and inspection labor varies in direct proportion to the size of the plant. Thus, a 100-ton plant drying potatoes can be expected to require from 60 to 100 women on the trimming belt; a 10-ton plant, 6 to 10. This direct relation does not hold true for the other operations. As the size of plant increases, the labor requirement per unit of output for these other operations decreases. Because of the need for at least one or more employees for each of many operations regardless of the throughput at those points, the smaller plants are at a disadvantage as compared to the larger ones, which can make more efficient use of labor. Except for sorting, trimming and blanching, the labor requirements are substantially the same for these seven vegetables.

The method of peeling materially affects the number of trimmers needed. Abrasion peeling of potatoes may require as many as 50 women per shift in a plant handling 50 tons per day. Lye peeling may reduce that number to between 30 and 40. Flame or radiant-heat peeling, brine peeling or other peeling methods may also result in a lower labor requirement for trimming.

The type of dryer affects labor requirements. A 50-ton tunnel dryer requires from 10 to 15 employees per shift for loading and stacking trays, moving cars, operating the dryer, scraping trays and washing trays. If a conveyor-type dryer is used instead of the tray type, and a suitable mechanical arrangement is available for spreading the products evenly over the conveyor belt, from two to four employees may be necessary to handle the drying operations in a plant of this size.

Segregation and Analysis of Processing Costs

It was pointed out in Part I that direct operating charges are much greater than capital charges in a vegetable dehydration plant, since in many plants, the monthly labor, raw material and packaging costs are more than the original capital outlay for buildings and equipment. The layout of the plant, the costs of the various plant elements, and the labor requirements have been considered. The present section deals with the problem of proper segregation and analysis of the various operating charges. Its purpose is to assist operators in developing a system of cost analysis that will indicate accurately the relative importance of various cost factors and the effects of changes in operating procedures.

A proper segregation and analysis of operating costs is of value to the plant operator as a means of (1) comparing the operating costs for different methods of preparation, drying and packaging (particularly valuable to prospective dehydrators); (2) comparing different raw materials: (3) obtaining accurate control over all phases of operation; (4) keeping the operator informed on current production costs; and (5) providing a proper and detailed record of operations for future reference or audit.

In order to simplify their consideration, operating costs are divided into the following main groups: Raw material cost, preparation cost, drying cost, packaging and warehousing costs, indirect and overhead costs (accounts must be set up in which these charges are accumulated before distribution to the first four groups).

This is a convenient grouping for discussion, since it covers the major steps most commonly followed in plants that handle vegetables. Each major step may be considered separately, and factors peculiar to that step need not be confused with any other. From an operating standpoint also, such a grouping has merit. In keeping these costs separate, the operator can compare various methods of operation. If tunnel drying on trays is to be compared with drying on a conveyor, costs associated with the actual drying steps are readily available for comparison.

For some purposes, a further breakdown is desirable. For example, the

TABLE VI—Approximate Labor Requirements Per Shift For Various Vegetables.

In a dehydration plant handling 50 tons per day, unprepared basis (dehydrater labor based on use of truck and tray-type tunnel dryers).

Job	Table beets	Cabbage	Carrots	Onions	Potatoes	Sweet potatoes	Rutabagas and turnips
Feeding to preparation line	1–2 M	1–2 M	1–2 M	1–2 M	1–2 M	1–2 M	1–2 M
Operating autoclave, sizer and/or peeler	2–3 M		0–1 M		0–1 M	0–1 M	0–1 M
Sorting and trimming	15–25 F	5–10 F	15–25 F	25–35 F	30–50 F	25–35 F	15–25 F
Spreading on blancher belt		0–2 F	0–2 F		0–2 F	0–2 F	0–2 F
Spreading on trays	1–2 F	1–2 F	1–2 F	1–2 F	1–2 F	1–2 F	1–2 F
Loading cars	2 M	2 M	2 M	2 M	2 M	2 M	2 M
Moving cars and operating dryer	2 M	2 M	2 M	2 M	2 M	2 M	2 M
Scraping trays	2–4 M	4 M	2–4 M	4 M	2–4 M	2–4 M	2–4 M
Placing trays on conveyor	1 M	1 M	1 M	1 M	1 M	1 M	1 M
Final inspection	2–6 F	4–8 F	2–6 F	4–8 F	4–8 F	2–6 F	2–6 F
Packaging, crating and warehousing	2–4 F 1–2 M	2–4 F 1–2 M	2–4 F 1–2 M	2–4 F 1–2 M	2–4 F 1–2 M	2–4 F 1–2 M	2–4 F 1–2 M
Other:							
Foreman	1 M	1 M	1 M	1 M	1 M	1 M	1 M
Forewoman	1 F		1 F	1 F	1 F	1 F	1 F
Helpers, cleanup, tray washer, carpenters, maintenance	4–6 M	4–6 M	4–6 M	4–6 M	4–6 M	4–6 M	4–6 M
Total number per shift							
Men	15–22	15–19	13–20	15–19	13–20	13–20	13–20
Women	20–37	12–26	20–39	32–49	37–66	30–49	20–39
Foreman	1	1	1	1	1	1	1
Forewoman	1		1	1	1	1	1

problems involved in peeling and trimming present a broad field for study. The relative advantages of lye peeling, brine peeling, heat peeling of various kinds, abrasive peeling and hand peeling, together with related trimming costs, warrant much consideration. For the purpose of making such studies, a detailed breakdown of preparation costs is valuable. For example, peeling, trimming and blanching may each be given separate consideration.

Raw Material Cost. As a rule, raw material is the largest single item of cost in a vegetable dehydration plant. In some instances, it may amount to as much as 50 percent or more of the total cost per dry pound. Any attempt to reduce operating costs should, therefore, include careful study and control of the raw material. Variety, growing conditions, time of harvest, handling and storage, all of which affect the quality of raw product, are extremely important in determining costs, yield and quality of dry product. An operator should contract for his raw material well in advance of actual need, so that the production, transportation and storage will be under his direct supervision and the product delivered to him will be the best obtainable.

The cost of raw product is magnified in the cost of the dry product to the extent of the overall shrinkage ratio[1] On cabbage, a cost increase of only a dollar a ton will result in an increased cost of almost one cent per dry pound. On a given vegetable, the quality and condition of the raw material will determine largely the overall shrinkage ratio. It is advisable in many cases to pay relatively high prices in order to obtain high-quality vegetables, since lower preparation losses and frequently lower drying losses will increase the yields and more than offset the higher purchase price.

A careful analysis of the interrelated variables (raw-material grade, preparation losses, trimming costs and drying ratio) is essential if the most economical combination of raw materials and preparation methods is to be attained. Charts such as those shown in Figs. 8 and 9 can be used conveniently to study the combined effect of these variables. For example, we find from Fig. 8 that a raw material which has a 20 percent preparation loss[2] and a 5-to-1 drying ratio yields 320 lb. of dry product per raw ton. If the combined raw-material and trimming cost is $60 per unprepared ton, we find (Fig. 9) that the cost per day pound is 19 cents. A cheaper raw material, costing only $50 per ton including trimming, is found to have a 30 percent preparation loss and a 5½-to-1 drying ratio. The charts indicate that this material also costs 19 cents per dry pound for raw material and trimming. Quality of final product may be the deciding factor in this case if waste disposal is not an important problem. The operator will find that similar graphs are

(*Turn to page* 118)

[1] The "overall shrinkage ratio" is the ratio of the weight of unprepared raw material to the resultant weight of finished product. The "drying ratio" is the ratio of the weight of material entering the dryer to the weight of material leaving the dryer.

[2] The preparation loss used for this purpose must be an overall preparation loss, determined in actual test runs, and must take account of the possible sources of error discussed in the following paragraphs.

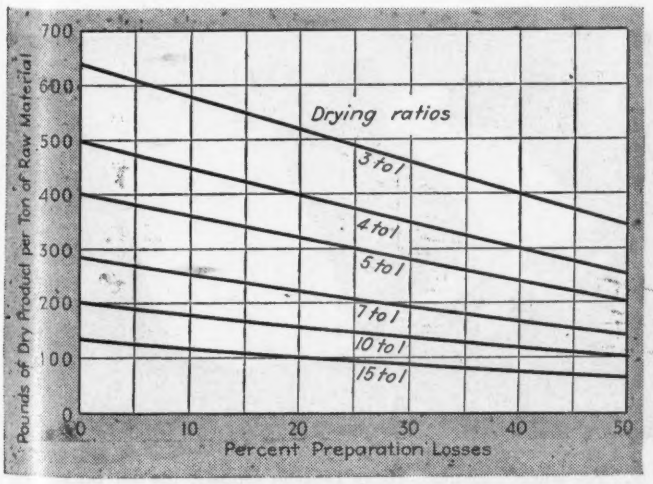


FIG. 8. Yields of dry product at various preparation losses and drying ratios.

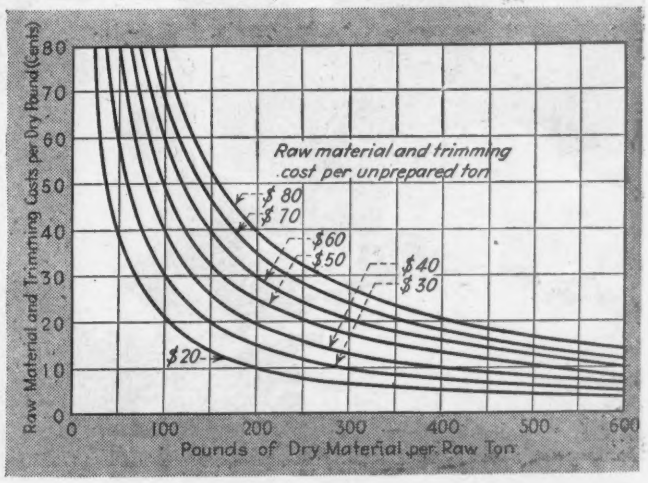


FIG. 9. Raw material and trimming costs per dry pound at various yields of dry product.

1. On a disassembly-line scale, fat backs are manually trimmed for removal of lean portions preparatory to rendering to make prime steam lard. Trimmers work on both sides of conveyor.

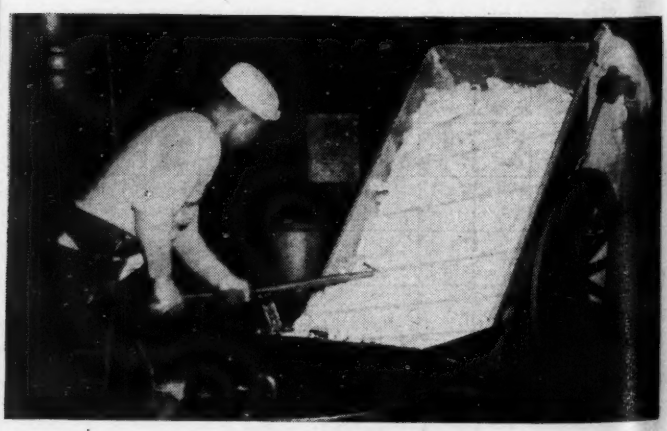
2. Following removal of lean trimmings, fat backs are replaced on conveyor for mechanical feeding through a steam-heated skinning machine into a metal wheel-mounted truck.

Pictures of Processes

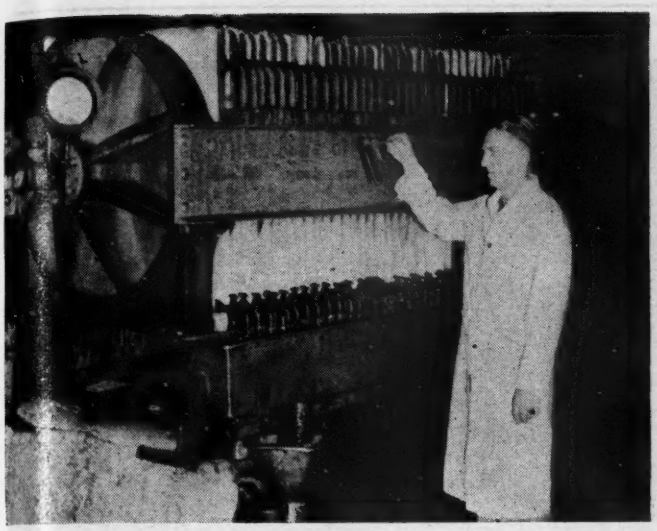
Lard making is an art and a science as well as an industry. Rendering, refining, chilling and packaging involve technology and laboratory control of the highest order for attainment of the desired qualities and uniformity in the finished product, as well as continuity of production. These pictures, taken in the Swift & Co. Chicago plant, illustrate the operations and processing steps involved.

5. After the melted fat has separated from the water and solids components by settling and layering, it is pumped to steam-coil heated refining tanks. After receiving its refining treatment, it is held at about 200 deg. F. and filter aid is added to obtain clarity.

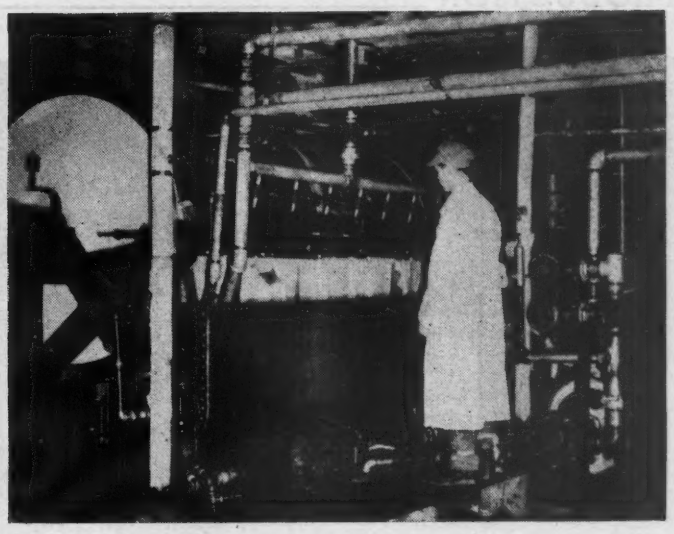
3. As hog carcass is disassembled into market cuts, fat trimmings fall through metal chutes from cutting floor to metal trimming tables for removal of lean or muscle meat.



4. As wheel mounted trucks become loaded, the fat backs and trimmings are charged through floor chutes into closed lard melters of autoclave type where they are heated to approximately 300 deg. F. by live steam, or into steam-jacketed open kettles.



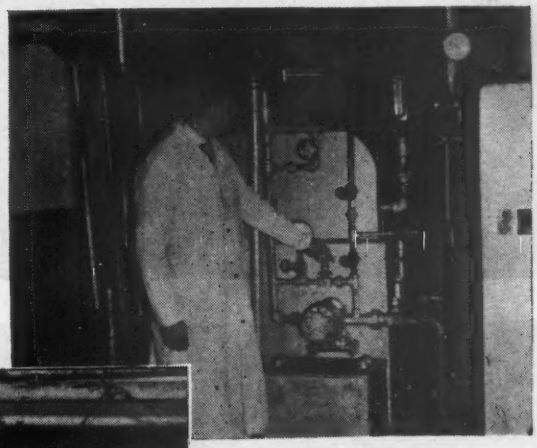
6. While being pumped through plate and frame filter, the filter aid, with absorbed solids, is removed. Performance of filter is checked by experienced operators.



9. Under traditional practice, lard is chilled by an ammonia-refrigerated roll. It is scraped from the roll into a screw conveyor which blends it while moving it to a pump.

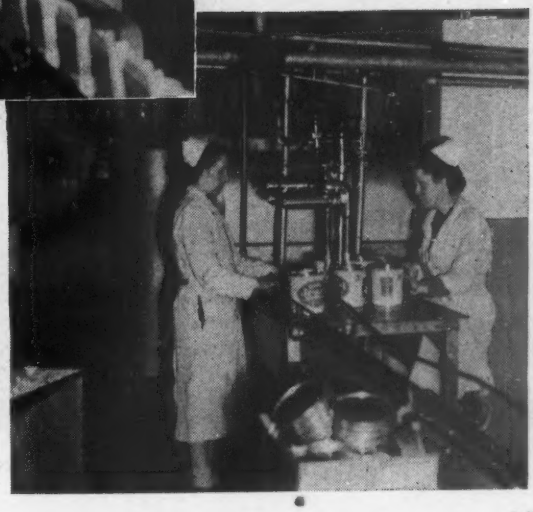
7. Following removal of suspended solids by filtering, the lard is heated to approximately 400 deg. F., while under almost full vacuum, for several hours to accomplish deodorization.

10. Chilling the modern way is accomplished in enclosed refrigerating units operating similar to continuous ice cream freezers. These units deliver the chilled lard as a homogeneous plastic directly to package filler through metal pipes.

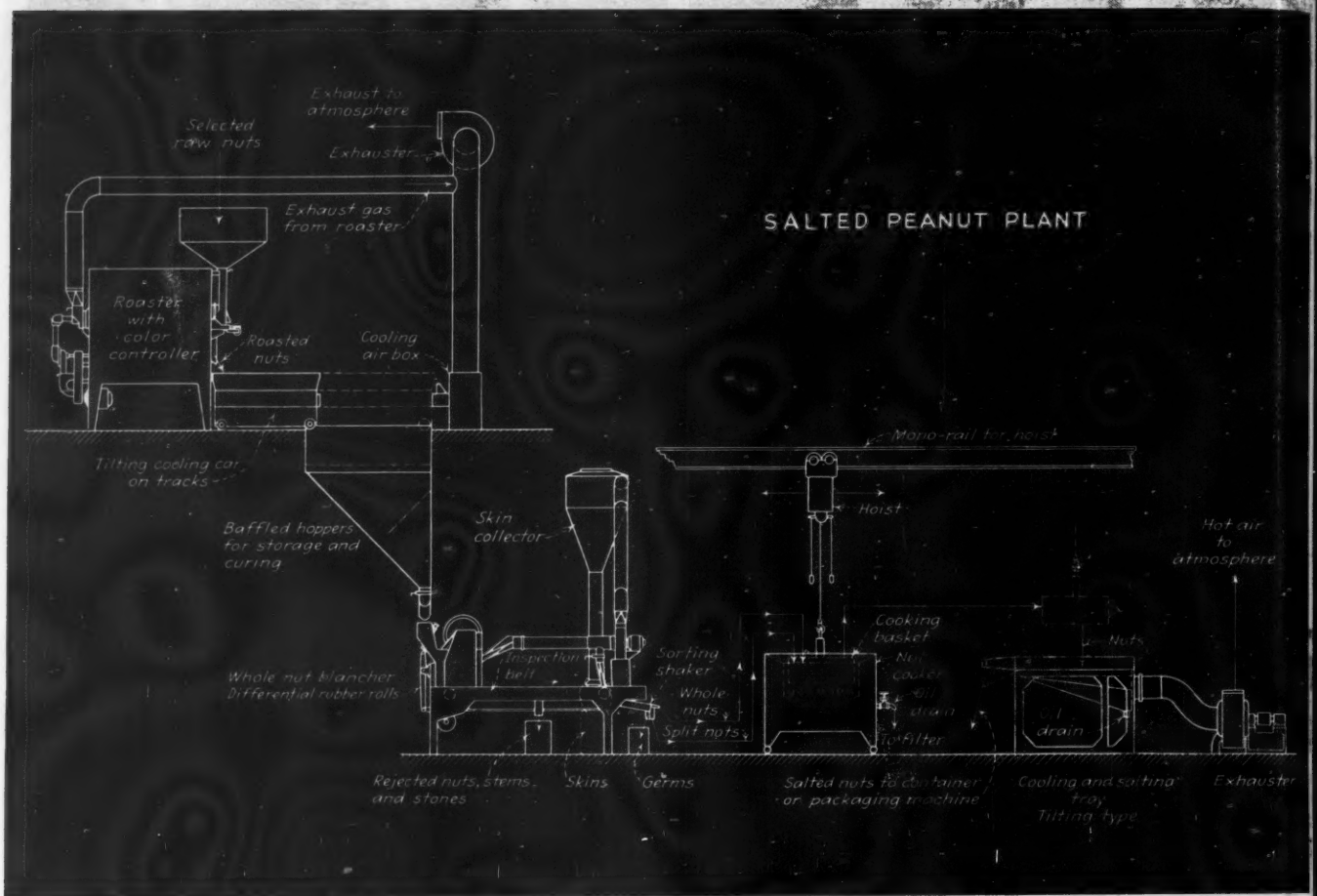


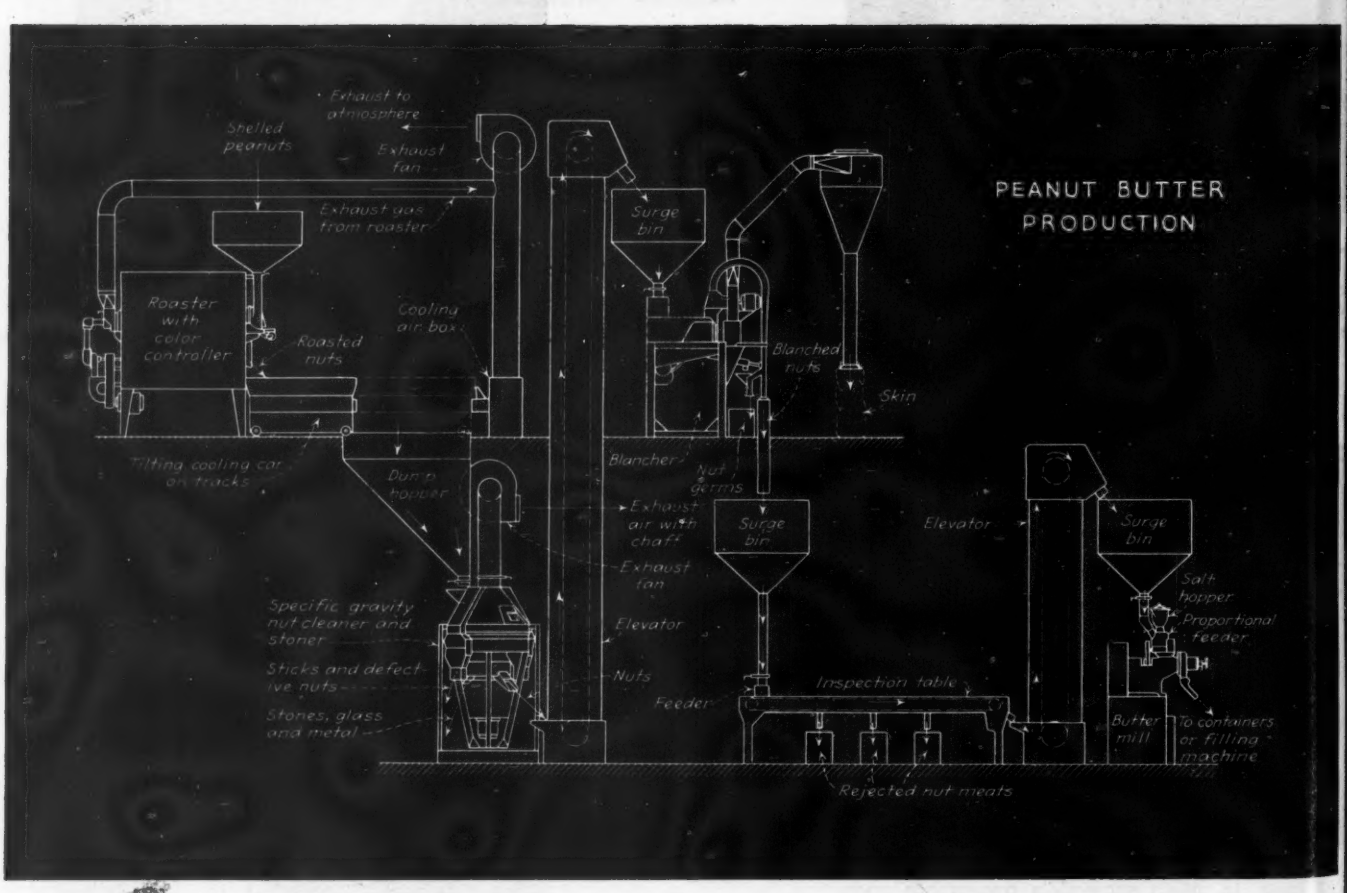
11. After chilling, the lard is delivered through an automatically flow-controlled filling machine into an automatically preformed and parchment-lined 1-lb. carton.

8. Clarity to obtain snow-white appearance upon solidification is further improved by filtering after the deodorizing treatment.



12. Prior to WPB restrictions, 3-lb. metal containers were automatically filled and weighed. A new non-metal 3-lb. container is in course of development.





Flowsheets for production of salted peanuts (above) and peanut butter (below).

Manual of Dairy Detergents And Cleaning Practices*

By M. E. PARKER, Manager of Production, Beatrice Creamery Co., Chicago, Ill.

PART II—Wetting agents, polyphosphates, abrasives are included in this installment of the author's practical survey of attributes and shortcomings of dairy washing compounds. The trade names and manufacturers of dairy cleaners are listed.

AUTHOR'S NOTE: *Listed herein are the trade names of several dairy cleaning compounds. This list is not complete but is illustrative. The manufacturers of these compounds have been freely consulted, and to their technical staffs is due considerable credit for their cooperation and collaboration in preparing this manual.*

IN the preceding part of this article, published in the July issue of FOOD INDUSTRIES, page 78, explanations were given of the properties and performances of the alkaline and acid cleaners used in dairy washing compounds. In this part, wetting agents, polyphosphates and abrasives are discussed.

Explanation of Wetting Agents

During the past few years a steadily increasing interest has developed in certain new types of synthetic organic detergents, comprehensively known as surface-active or wetting agents. Wetting agents in general have some or all of the following properties: Wetting-out, dispersing, emulsifying, penetrating and cleaning.

Soap is the oldest, the best known and still the most commonly used wetting agent both for industrial and domestic purposes. It reduces surface tension but cleans only under favorable conditions, which frequently are not to be found in dairy equipment cleaning practices.

The operation of a wetting agent in general cleaning has been likened to cleaning a street. The dirt is loosened from the surface in which it is embedded, swept into piles, then collected and removed. By lowering surface tension, the wetting agent penetrates the interface between the surface and the dirt upon it, breaking the bond between the dirt and the material to which it adheres. Particles of soil, in the presence of water and the wetting agent, tend to clump together, and the rinsing operation carries the clumps of dirt away.

Soap Powders. Many household cleaners contain varying amounts of soap. While soap has a high cleaning value, its use in dairy cleaning problems is not advisable inasmuch as soap invariably leaves a film on the surface of the equipment that builds into a hard grease which holds dirt.

Wetting Agents. In selecting a wetting agent for dairy equipment cleaning, a distinction must be made between those which merely lower surface tension and those which have, in addition, detergent or cleaning properties and are generally known as super-soaps, soapless soaps or organic detergents. Wetting agents may be mildly acidic, mildly alkaline or neutral; they are usually sold in a neutral condition. They do not hydrolyze like soap; yet they can be definitely corrosive under certain chemical conditions. Detergents containing wetting agents are much more readily rinsed away than either plain alkaline solutions (because of their much lower surface tension) or soap solutions (because they are not absorbed upon surfaces as is soap). Also, some wetting agents have a potent bactericidal action in addition to their cleaning properties. In the light of present-day knowledge, it is best for the average dairyman to use those cleaners especially designed for dairy cleaning purposes which, in their compounding, make maximum use of the wetting agents especially prepared for such purposes. An increasing number of such compounds is being offered. Caution must, however, be expressed against the indiscriminate use of wetting agents in combination with acids or alkalies, as such "shot-gun" mixtures are apt to prove costly in the extreme. The field is too new for amateurs to romp in blindly.

EXAMPLES: *Acid cleaners (with wetting agents)—Mikro-San, Mikro-Stat, Wyandotte S. R.-5, Magnus 66. Alkaline cleaners (with wetting agents)—Wyandotte GLX, Solvay Cleanser 600, Wyandotte Keego Cleaner, Solvay Cleanser No. 800, B-K General Cleanser, Metso 22, Metso 66, Magnus IDX, Rex No. 372-2 Dairy Cleanser.*

Explanation of Polyphosphates

The sodium polyphosphates cover a range of complex sodium phosphates produced by the thermal treatment of monosodium phosphate, or that compound mixed with varying amounts of alkali. The fusion of monosodium phosphate to dull red heat and subsequent chilling results in the production of the water-soluble sodium hexametaphosphate (sometimes called sodium metaphosphate). If a predetermined amount of alkali is added to monosodium phosphate and the mixture fused, followed by chilling, then the water-soluble sodium tetraphosphate results. However, both the metaphosphate and tetraphosphate are glasses, which means that they do not conform to one empirical chemical formula. It is possible to add varying amounts of alkali to monosodium phosphate before fusion, and the result is known as adjusted sodium hexametaphosphate. If sufficient alkali is added to monosodium phosphate and the proper thermal treatment is applied, sodium tripolyphosphate results, which is a definite anhydrous crystalline polyphosphate.

The three major polyphosphates now being used largely as water conditioners in dairy detergency, which have limited use as dairy cleaners in some instances, are described briefly in Table IV.

TABLE IV—Polyphosphates.

Common name	Chemical name	Chemical formula
Metaphosphate...	Sodium hexametaphosphate	$(NaPO_3)_6$
Tetraphosphate...	Sodium tetraphosphate	$Na_6P_4O_{13}$
Pyrophosphate...	Tetrasodium pyrophosphate	$Na_4P_2O_7$

Each of these three major polyphosphates has definite functions to perform, with some overlapping of properties, but mainly they are valuable for their water-conditioning or softening characteristics.

The pH and sodium oxide contents

*Prepared for Research Committee of American Butter Institute.

of these products in order of their increasing active alkalinity values in a 1 percent solution are given in Table V. However, the active alkalinity of the polyphosphates is not nearly as important in an appraisal of their properties as in the case of the five major alkalies described in Part I, FOOD INDUSTRIES, July, 1943, page 79.

TABLE V—pH and Sodium Oxide Values.

Common name	pH Value in 1 percent solution (at 75 deg. F.)	Total Na_2O (Sodium oxide) (percent)
Metaphosphate	6.5 (slightly acid)	30.8
Tetraphosphate	7.4	39.6
Tetrasodium pyrophosphate	9.8	46.2

Sodium Metaphosphate. When used in very small amounts, sodium hexametaphosphate has the ability to inhibit the precipitation of calcium and magnesium salts when the alkalinity or the temperature of the water containing temporary hardness is increased. This effect, called a "threshold effect," is observed in waters when heated to temperatures of about 190 deg. F. and must be distinguished from the softening effect in which larger quantities of metaphosphate are required. When larger amounts are used, it has the capacity to prevent precipitation or to redissolve precipitates of calcium and magnesium salts and render them inert so that they will not react with most precipitants. Added to an alkaline solution, it is generally of considerable aid in increasing dispersion, deflocculation and peptization.

Traces of milk solids, plus the extraneous matter from the outside surfaces of transport cans and farm utensils, cannot be handled effectively by water conditioned or softened with metaphosphate. While sodium metaphosphate used by itself is not a good detergent, mixtures of sodium metaphosphate with properly chosen alkalies are excellent detergents and have been found effective in eliminating or preventing the tendency of alkaline cleaners to form waterstone-milkstone deposits. In fact, if these deposits are not too persistent nor tenacious, metaphosphate has curative as well as preventive properties.

It is prudent to exercise caution in the use of metaphosphate solutions in a hot condition as many of its otherwise beneficial properties can be dissipated, particularly when an appreciable contamination of milk solids develops, as is often the case in the operation of power-driven can washers.

EXAMPLES: *Dairy Calgonite; Calgolac.*

Sodium Tetraphosphate. Sodium tetraphosphate has proved to be the most effective all around polyphosphate for preventing the precipitation of both calcium and magnesium salts.

The fact that sodium tetraphosphate is slightly alkaline, rather than acid, is an advantage in many operations. The stability of tetraphosphate under the adverse conditions of heat and contamination by milk solids is, of course, one of the desirable features. It is quite effective in reducing corrosion.

EXAMPLE: *Quadrafos.*

Tetrasodium Pyrophosphate. Pyrophosphate does not compare with the tetraphosphate in water-softening ability, and in general it is necessary to use 3½ to 4½ lb. of pyrophosphate for every pound of tetraphosphate. The only advantage of pyrophosphate is a lower price per pound, which is more than offset if the calculation is made on the basis of cost per unit of water-softening value. The solubility of metaphosphate and tetraphosphate is one of the features which makes them preferred to pyrophosphate.

Judging by present trends, many of the better cleaners for use in hand washing operations in creameries and dairies will in the future contain a substantial amount of tetrasodium pyrophosphate, as it tends to eliminate water spotting, which in reality is the precipitation of water hardness on the surface cleaned. With tetrasodium pyrophosphate, the hardness is held in solution and carried off by rinsing, instead of being precipitated.

In can-washing operations, a cleaning compound with a substantial addition of tetrasodium pyrophosphate is especially effective in reducing milkstone deposits on the can as well as lime deposits on the machine, and the necessity of cleaning up clogged jets is reduced to a minimum.

EXAMPLES: *Diamond All Purpose*

(*Turn to page 131*)

TABLE VI—Trade Names and Manufacturers of Dairy Cleaning Compounds.

Product	Manufacturer
B-K General Cleanser	Pennsylvania Salt Co., Philadelphia, Pa.
Calgolac	Calgon, Inc., Pittsburgh, Pa.
Dairy Calgonite	
DuCleen	E. I. du Pont de Nemours & Co., Wilmington, Del.
Diamond All Purpose Cleanser	Diamond Alkali Co., Pittsburgh, Pa.
Gluconic Acid, 50%, Technical	Charles Pfizer & Co., Inc., New York, N. Y.
Hydroxyacetic Acid	E. I. du Pont de Nemours & Co., Wilmington, Del.
Magnus Bottle Soap	Magnus Chemical Co., Inc., Garwood, N. J.
Magnus Supersils	
Magnus D-Scale-R	
Magnus IDX	
Magnus K-Solv	
Magnus 66	
Magnus Surfex	
Metso Anhydrous	Philadelphia Quartz Co., Philadelphia, Pa.
Metso Crystals	
Metso Granular	
Metso 22	
Metso 66	
Mikro-San	The Rex Co., Burlington, Ia.
Mikro-San No. 1029-1	
Mikro-Stat	
Nufos Briquets	Mathieson Alkali Works, Inc., New York, N. Y.
Oakite Milk Stone Remover	Oakite Products, Inc., New York, N. Y.
Quadrafos	Rumford Chemical Works, Rumford, R. I.

Product	Manufacturer
Rex Cleaner & Cleanser	The Rex Co., Burlington, Ia.
Rex No. 372-2 Dairy Cleanser	
Rex No. 2 Flake Alkali	
Solvay Anchor Alkali	Solvay Sales Corp., New York, N. Y.
Solvay Cleanser No. 600	
Solvay Cleanser No. 800	
Solvay Cleansing Soda X	
Solvay Fluf	
Solvay Super Alkali A	
Solvay Super Alkali No. 1	
Solvay Super Alkali No. 3	
Solvay Super Alkali No. 4	
Solvay Super Alkali No. 5	
Solvay Super Alkali No. 60	
Solvay Super Alkali No. 85	
Solvay Super Detergent	
Wyandotte Alkali Special	Wyandotte Chemicals Corp., Wyandotte, Mich.
Wyandotte Cleaner & Cleanser	
Wyandotte C W	
Wyandotte Detergent	
Wyandotte GLX	
Wyandotte Industrial Alkali	
Wyandotte Keego Cleaner	
Wyandotte Soda 70	
Wyandotte S.R.-5	

* This index lists manufacturers of compounds mentioned by the author.

Seven Ways to Beat Bacteria In a Dry Milk Plant

By PAUL S. PRICKETT, Bacteriological Laboratory, Mead Johnson & Co., Evansville, Ind.

Food, moisture, proper acidity, temperature, time needed for bacterial growth. Good housekeeping and elimination of at least one of these factors at critical points will reduce bacteria counts

THE operator of a dry milk plant has as his principal raw material a product that is peculiarly susceptible to bacterial attack. To avoid contamination and insure an acceptable product it is necessary to know the basic factors controlling bacterial growth. In order to grow and multiply, bacteria must have moisture, food, favorable pH, favorable temperatures and time in which to grow.

By controlling and manipulating these basic factors, the dry milk plant operator has at his command seven ways to beat the bacteria: (1) Take away all or part of their water. (2) Deprive them of their food. (3) Force unsuitable temperatures on them by making it either too hot or too cold for them. (4) Make their environment too acid or too alkaline. (5) Give them too little time in which to multiply and grow by hitting them hard before they get started. (6) Treat them with germicidal chemicals or ultraviolet light. (7) Shoot steam, soap and elbow grease at them.

Separator Caused Trouble

Some steps in the drying process are more vulnerable to bacterial attack than others, but with the weapons at his command the operator can meet them. For example, one operator was having trouble controlling the bacterial counts at one of the first steps in his process—at the separator. He was doing a good job of cleaning the separator, but in assembling it after cleaning he was recontaminating it; and as he was assembling it quite some time before it was to be used, the bacteria had time in which to multiply in the assembled apparatus. He beat the bacteria by assembling the separator only a short time before it was to be used and then running very hot water through it to destroy and flush out the contaminating organisms.

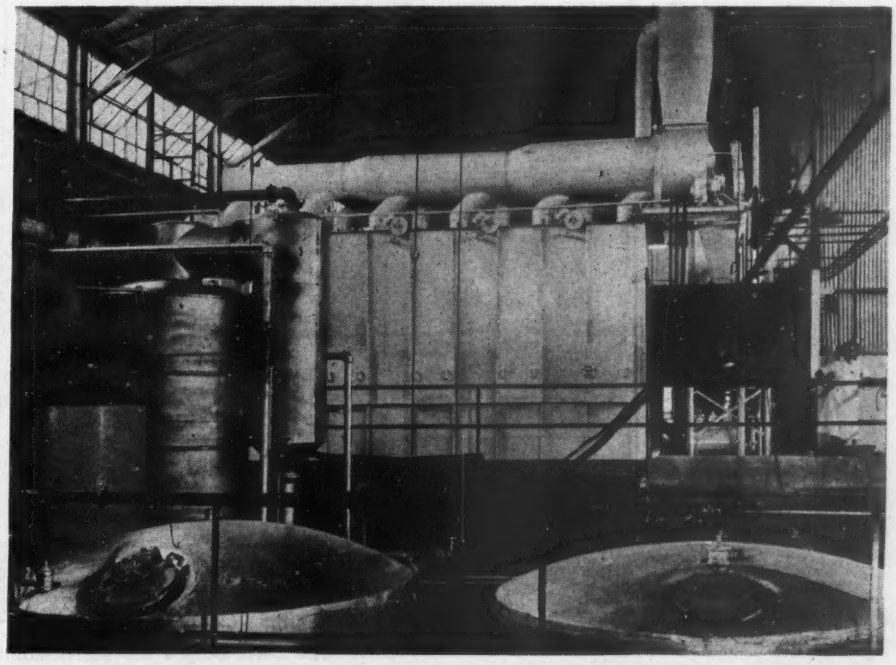
Bacterial Growth in Hotwells

In some plants the skim milk is run directly into the hotwells, in others into a holding tank. If a holding tank is used, bacteria will multiply, provided the temperature is favorable and enough time is allowed, but the hotwells may also prove to be excellent breeding places for bacteria. Discovery of this fact has surprised and puzzled many operators who have assumed the temperature of the milk in the hotwells to be too high for bacterial growth. Of all known forms of life, bacteria are able to grow under the most diverse conditions. Some not only survive but actually grow at temperatures as low as 32 deg. F., while others bask and thrive at temperatures around 200 deg. F. The heat-loving bacteria are known technically as "thermophiles." Admittedly it takes an exceptional thermophile to do really well at 200 deg. F., but many of them grow luxuriantly at 165 to 170 deg. F., and the optimum growing temperature for practically all thermophiles is well above the pasteurizing temperature of 145 deg. F.

High Bacteria Count Found

Studies made at the New York State Agricultural Experiment Station have shown that the milk in hotwells usually is teeming with thermophilic bacteria. Furthermore, the longer the milk remains in the hotwells the more the thermophiles develop, so that substantial numbers survive further steps in the process and are present in the dried milk.

Thermophilic bacteria are usually present in small numbers in the raw milk. The skim milk introduces them into the hotwells, where they find a suitable temperature maintained for a time that is long in terms of a thermo-



Spray drying equipment in a modern milk plant is designed to eliminate sources of bacterial contamination, but constant bacteriological control of every step in the process is needed to prevent occasional high counts developing at some point in the process.

phile's life, for they reproduce about every 15 minutes. In addition to the favorable factors of temperature and time, the thermophiles also find themselves provided with ample food and moisture.

The operator cannot control the organisms at this step by using an unfavorable temperature (chilling the milk), and since he is working with milk, he cannot deprive the organisms of food and moisture. He cannot shorten the time by evaporating all of the skim milk instantaneously, but he can shorten the time in another way. By emptying a hotwell and flushing it out thoroughly about every two or three hours, the operator can knock the bacterial multiplication in the head before the bacterial population gets large enough to cause trouble.

Vacuum Pan Contamination

Some of the thermophiles carried over from the hotwells will be killed in the vacuum pan, but not many of them. The temperature of the milk in a vacuum pan does not usually get high enough to have a very pronounced germicidal effect. The reduction of moisture in condensing will help some, but the more rugged organisms will survive.

A dried milk plant was having trouble with sudden, unaccountable increases in bacteria in the vacuum pan. The water supply for the barometric condenser was drawn from a small pond into which the water from the tail pipe was discharged, so that the same water was used over and over. The bacterial quality of the condenser water was extremely poor. Despite the manager's declaration that it couldn't happen, the vacuum pan at times did surge or "suck back," thereby drawing in a slug of the highly contaminated condenser water. This accounted for the sudden and erratic increases in the bacterial counts.

From the vacuum pans the evaporated milk is usually fed into holding tanks that supply either the homogenizer or the dryer. In these tanks, difficulties similar to those in the hotwells are liable to be encountered, but bacterial growth in them can be controlled by very similar methods.

Cleaning the Homogenizer

If a homogenizer is used, this particular step in the process will have to be watched very closely. The equipment manufacturers have been alive to the situation, and in recent years these machines have been designed and built to facilitate cleaning. However, care must be exercised to prevent bacterial

(Turn to page 130)

New Maintenance Plan Helps Truck Operators

Ethyl system controls check-ups and gives helpful instructions to mechanics and drivers. Work may be done at service stations if operator lacks facilities

TO help small truck owners, including those in the food industry, Ethyl Corp. has developed a new wartime program of preventive-maintenance control. This program, worked out in cooperation with ODT, provides a means of keeping more trucks rolling for the duration.

Intended as a service to its customers, the system differs from similar programs in that the preventive maintenance work may be done at a gas or service station. This is important to truck owners who have no maintenance facilities or who cannot obtain the services of skilled truck mechanics.

In addition to listing the preventive-maintenance work needed, this system includes manuals on how it should be done. The "how" part is intended to help either the small truck owner or the service station do the work with such men as are now available.

Four Parts of System

The system is made up of four parts: (1) A control kit for each truck, consisting of a manila envelope and 12 red, white and blue check-up cards; (2) a manual outlining in detail what inspections, adjustments and services are necessary on each card; (3) a manual of practical pointers on engine maintenance; and (4) a booklet on better driving methods for distribution among truck drivers.

The preventive-maintenance control-kit envelope has columns printed on the inside back, covered by the flap, where the mileages at which the maintenance

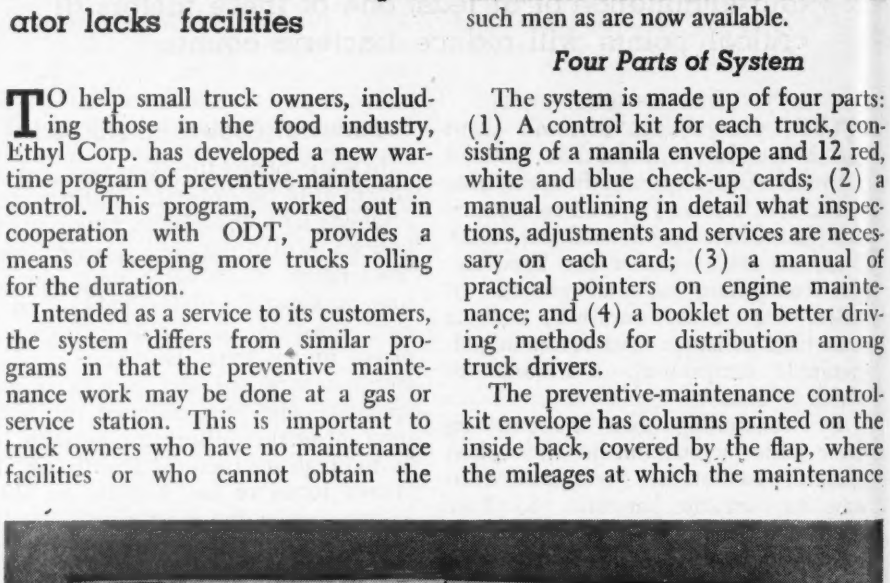


FIG. 1. The Ethyl Corp.'s preventive-maintenance-kit envelope, illustrating how the "due" mileages and the mileages at which the maintenance is actually done are recorded on the envelope. Preventive maintenance is performed according to the check-up cards (see Fig. 2) which are inserted in the envelope.

is due and those at which the work is actually done are recorded. Twelve red, white and blue check-up cards are contained in this envelope. The red card is the basic one, and provides for chassis lubrication and a general inspection of the truck, including tires, battery and engine oil changes. This card contains a list of 14 items which should be checked at least once a month or after every 750 to 1,250 miles of operation, depending on the type of service in which the truck is used. For heavy loads over rough roads, it is recommended that the red-card inspection be given after every 750 miles; for average work, after every 1,000 miles; and for light loads on good roads, after every 1,250 miles. Oil changes may be made after every other red-card inspection, according to the age of the truck, the amount of engine cylinder wear, operating temperatures and other factors.

The white check-up card covers all the items of the red card, and in addition, provides for an engine tune-up, an inspection of the electrical system of the truck and for rotation of the tires. The work called for on this card should be done after every 3,000 to 5,000 miles of operation on a mileage basis, or every 6 months on a monthly basis.

The blue-card inspection includes not only all of the items on both the red and white cards, but also provides for the general tightening up of the vehicle, a complete brake inspection and wheel-bearing adjustment. The blue-card preventive maintenance should be performed after every 9,000 to 15,000 miles of operation, once a year on the monthly basis, or every twelfth check-up.

Special Cards

If the owner operates trailers, a special trailer check-up card can be furnished on request. Also, if a truck maintained under this system operates over 15,000 miles a year, a special unit control card can be furnished to cover carburetors, distributors, fuel pumps and other parts which are normally overhauled or exchanged every 20,000 to 25,000 miles.

The truck owner sends the truck with the control kit to the station to have the work done. The service man performs the work in accordance with the items listed on the proper cards, signs his name on that card and returns the control kit to the owner along with the truck.

If the maintenance is done on a mileage basis, the mileage at which the truck should again be sent to the station is marked on the kit envelope, as shown in the accompanying illustration.

RED CARD
PREVENTIVE MAINTENANCE CHECK-UP
WHITE CARD
PREVENTIVE MAINTENANCE CHECK-UP
BLUE CARD
PREVENTIVE MAINTENANCE CHECK-UP
1. ☐ WASH VEHICLE.
☐ Clean chassis.
2. ☐ LUBRICATE VEHICLE (use approved instructions).
3. ☐ OIL CHANGE.
Engine pan, quarts
Air compressor pan, quarts
☐ Check for leaks. Tighten as needed.
4. ☐ CLEAN OIL FILTER HOUSING.
☐ Install correct new filter cartridge.
5. ☐ CHECK LUBE LEVELS: ☐ Transmission. ☐ Axle.
(Drain and refill each Spring and Fall, or each 12,000 miles. Use correct seasonal lubricant.)
☐ Check for leaks. Tighten as needed.
6. ☐ TIGHTEN spring U-Bolts.
7. ☐ TIGHTEN UNITS. Thorough inspection.
In good condition and secure. Service as needed.

FIG. 2. The red, white and blue check-up cards listing the maintenance work needed on the trucks at various mileages or time intervals according to the size, make and type of truck and the kind of work in which it is engaged.

The possession of the kit cards by the truck owner gives proof to the ODT and the local rationing board that the truck is being given adequate care.

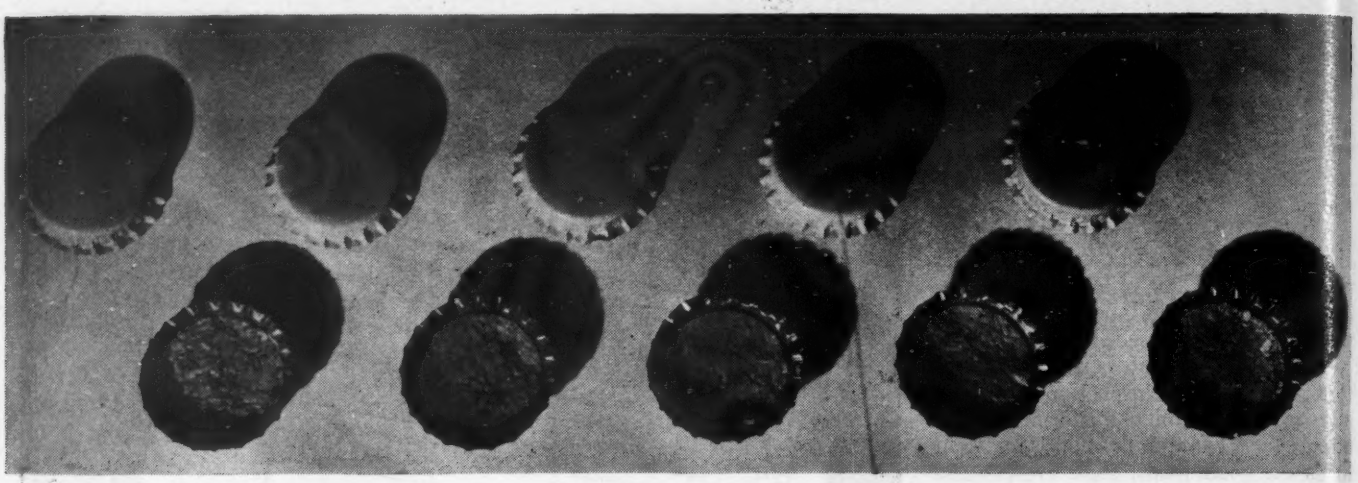
The manual of preventive maintenance ties in with the three check-up cards by heading the text with numbers corresponding to those listed on the cards themselves. Each numbered section gives a concise description of the operation to be performed.

The 30-page illustrated booklet giving practical pointers on engine maintenance has various chapters showing how work should be performed on fuel tanks, fuel pumps, carburetors, valves, manifolds, ignition, spark plugs, cooling systems, air cleaners and crankcase ventilation.

The manual on professional driving is unusual in that it was compiled from personal interviews with more than 100 of the world's finest drivers. This 72-page booklet makes no attempt to teach the driver how to drive but aims to improve his driving, as a means of reducing accidents and repairs to keep our trucks rolling for the duration.

Courtesy Ethyl Corp.

FIG. 3. Here's one of the many reasons why preventive maintenance pays dividends to the truck operator. This tire has been ruined by the grinding action between the tread and the road caused by the front wheels being out of alignment.



Crowns that have been reconditioned by Haffenreffer, showing enameled outside and lacquered inside, with new cork disks.

Making Crowns Do Double Duty

Brewer develops efficient methods for reconditioning used bottle caps as one step in licking crown shortage problem

By A. H. HAFFENREFFER, Jr.,
Haffenreffer & Co., Inc.,
Boston, Mass.

HAFFENREFFER has met the cap shortage problem by reconditioning used crowns and by reclaiming tin from cans and sending the tin to a crown manufacturer to be made into caps. It took a great amount of patience to develop methods for performing these salvage operations, but the operations have paid off manyfold in the production of bottled beer that they have made possible.

Reclaiming of used crowns is the more difficult of the two processes—and the one that pays the biggest dividends. No less than 2,000 gross of crowns are being reconditioned each week with the labor of eight men—an efficiency that was attained only after less productive methods were devised, put into practice and then improved through knowledge gained from experience.

Briefly, the reconditioning process involves sorting old caps to eliminate junk, boiling in a caustic solution to remove the lithography and the cork liners, drying in a hot-air oven, reforming by pressing the caps back into shape in dies, lacquering the inside and painting the outside, then drying in an oven and inserting new cork linings.

Step by step, here's how these operations are performed on the used caps that consumers are induced by advertising to return to retail outlets.

After the caps are sorted by hand, the usable ones are boiled for an hour in a 12 percent caustic soda solution in two round-bottom, steam-jacketed copper kettles holding about 70 gross each. Then a high-pressure stream of cold water is directed into the kettles. This water violently agitates the caps. But more than that, it provides a sudden change of temperature which separates the cork from the metal by means of the difference in the contraction rate of the two materials. About 15 minutes of this cold-water wash loosens the lithography and corks and floats the debris over the edges of the kettles and into a screened drain which catches the refuse. The two kettles are tilted toward each other slightly so that they overflow at one side into a common drain.

After being cleaned of their lithography and decorked, the caps are put on wire-mesh trays and dried in a steam-heated plywood oven in which air is circulated at a temperature of about 170 deg. F. This oven holds some 800 gross of crowns.

The next operation is reshaping the crowns to straighten the kinks put into them by bottleopeners in the hands of consumers. It is important that the reforming operation give sufficient flare to the skirts of the crowns so that the crowns do not nest together in future handling. The proper flare will permit the crowns to be fed into the crowning machine without falling out into the hands of the operator and shattering his respect for the whole crown department. At Haffenreffer's the caps are satisfactorily reshaped on a Johnson reforming unit with two reciprocating plungers which press the caps into female dies. The first plunger spreads the rim. The second one flattens the top and reforms the corrugated rim with enough flare to prevent nesting. The plungers operate together, the caps being moved first under one and then the other by an oscillating finger-type conveyor. Cam-operated fingers force the caps from the dies after the plungers lift on their upward travel. In feeding this machine, the caps are turned upside down on a rotating table that transports them into the conveyor.

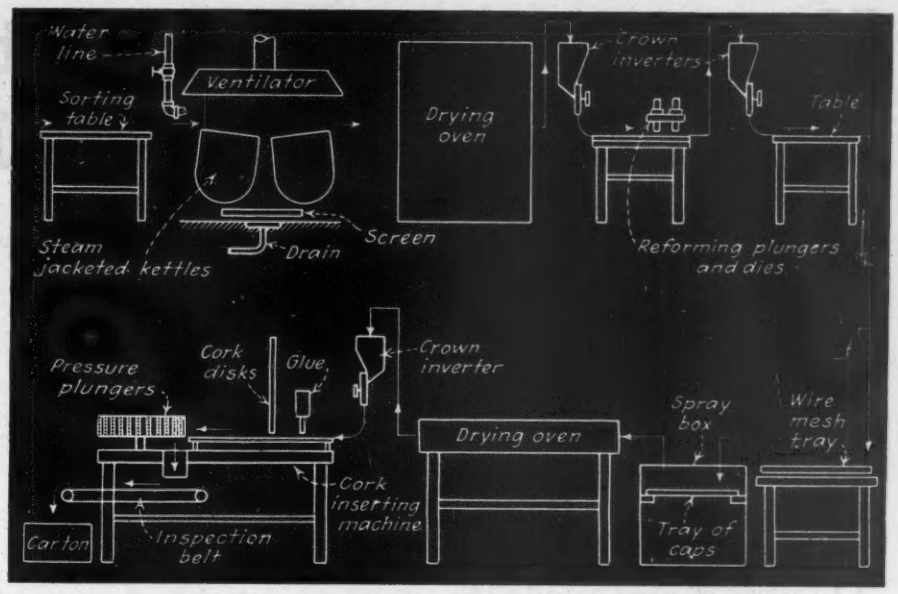
There are numerous devices for reforming caps, one of which is a converted crowning machine like the Adriance. By extending the crown plungers to the table level and installing female dies at that level, you have in reality a dial press, and the caps can be fed in at one side and removed from the female dies, after stamping, with a jet of compressed air. This type of equipment was used by Haffenreffer before the more efficient Johnson machine was installed.

Now comes the most difficult and generally the most serious operation—painting the reformed crown. Lacquers dry in the air in five minutes, in many

cases only to be completely gone when the caps emerge from the bottle pasteurizer. Enamels require a baking oven. Blackening processes are being used, as are also tumbling and dipping, the latter requiring an infra-red bake followed by an oven bake. But at Haffenreffer's we spray the caps with lacquer on the inside and with enamel on the outside, then dry them in 130-deg. air in a plywood oven. This operation, however, is not so simple as it may sound.

First of all, the caps must all be turned upside down, a laborious operation if done by hand, but an efficient one if performed automatically with a crown sorter from a capping machine—and that's how we do it. As the caps discharge upside down from the sorter, two men arrange them on wire mesh trays. The trays then are placed into a paper-lined plywood spray bin, the trays resting about one foot below the top edges of the bin. The paint man then sprays the insides of the caps with lacquer, using a compressed air spray gun. To turn the caps over for spraying the outside with grey enamel, another tray is placed over them, and the two trays inverted together so that the caps rest right side up on the bottom one. The top tray is then removed and the caps sprayed with enamel. The trays of painted crowns are now moved into the drying oven, where they remain for about five minutes, a bake long enough that the caps hold up in the pasteurizer.

Last in the sequence of cap reconditioning operations is the insertion of the cork lining. For this we use a Johnson cork inserting machine which automatically sorts the caps, applies glue to the inside of the cap, inserts the cork disk and applies pressure to the cork while the glue sets. And as the finished



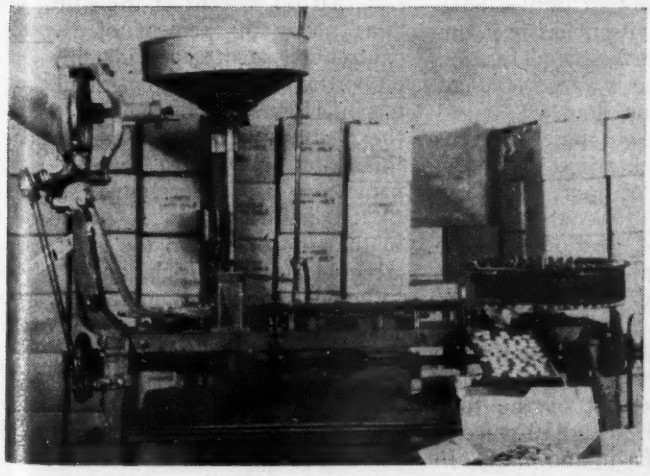
Schematic flowsheet of the crown reconditioning process.

caps leave the cork inserting unit, they come out on a belt conveyor which permits inspection for faulty ones.

Before we installed the cork inserting unit, we used a crowning machine with the reciprocating plungers elongated to table level, as in the first cap-reforming machine employed. These plungers forced the cork into the caps under pressure, and this method functioned well for the three months that we used it, although it required a comparatively large amount of labor. In this work we found that if the cork liners are inserted in the bottling plant and the crowns used immediately, the cork disks, which are slightly oversize, can be stamped into the caps without using an adhesive. But the best bet is a machine which glues the cork disks in automatically.

Looking at this reconditioning process from the cost standpoint, it is evident that much depends upon the ingenuity of the man who designs the necessary machines. As we now operate at Haffenreffer's, eight men are required to produce 360 gross of finished caps per 8 hours. One man handles the cork and lithography removing operation. Two are on the reforming and crimping part of the process, three are in the paint department, and two operate the cork inserting machine. But it would not surprise me at all to hear that some competitor is producing 500 gross a week with six men. Be that as it may, we will all thank God when we can again call up the crown representative and say, "So many gross delivered tomorrow, please."

An article describing the methods used by Haffenreffer to reclaim tinplate from old cans so that it can be made into crowns will be published in September.—THE EDITORS.



This machine inserts the cork disks into the crowns, gluing them in and applying pressure while the glue sets. Not shown here is an inspection belt onto which the finished caps discharge.

After reforming, the crowns are sprayed with grey enamel outside and lacquer inside, and then are dried in plywood oven shown behind the spray box.

How Distribution of Vitamins In Wheat Affects Flour*

By JOHN S. ANDREWS, General Mills Research Laboratories, Minneapolis, Minn.

Nutritional value of different types of flour is influenced by uneven distribution of vitamins in wheat kernel. Extended extraction produces large increases in thiamine but only relatively minor changes in riboflavin and niacin contents

EXPERIENCE has shown that the milling of wheat to yield long-extraction flours is accompanied by significant increases in thiamine. However, similar changes from the amounts present in patent flour are not observed in the instance of riboflavin and niacin. This is due largely to the fact that these three vitamins are not similarly distributed throughout the wheat kernel.

Wheat germ has usually been considered to be the focus of thiamine concentration, but recently other tissues have been found richer by nearly 50 percent. The niacin content of the germ is even below that of whole wheat, niacin being concentrated mainly in the bran.[1] Only in the instance of riboflavin does wheat germ appear to maintain its original reputation. Here it excels whole wheat by six to eight times, and no other richer tissue has been found. Some of these relations are graphically illustrated in the accompanying chart.

Effect of Long Extraction

In determining the effect of extended extraction, the vitamin contents were calculated for the combination of products which would be approximately represented. Thus the combination of patent and first clear was used for estimating a 70 percent extraction, and by the addition of second clear, this was raised to about 75 percent, and so forth. Once again different milling methods would be expected to modify the extraction values shown here, and for this reason the distribution curves must be considered only as indicative of general trends.

It will be noted that each of the curves has a different shape, demonstrating that each of the three vitamins is differently distributed. As milling extraction is extended, thiamine first shows a rapid rise and then tapers off somewhat as the final branny portions are included. This is due to the relatively high concentration of the intermediate products, particularly red dog and shorts, and the lower content of bran.

In the case of riboflavin, increased extraction does not produce anything approaching the behavior exhibited by thiamine. In the first place, patent flour contains more than twice as much of the *total* riboflavin as it does of thiamine and is about one-third as concentrated as the whole grain. In addition, there are no marked differences in the branny portions, and thus their inclusion produces approximately a linear increase in riboflavin content.

Niacin distribution resembles thiamine distribution in that patent flour contains practically the same relative quantities of these two vitamins. But here the resemblance ceases. Extended extraction fails to show a comparable increase in niacin content until a large portion of the bran itself has been included. At this point, a large fraction of the total thiamine is already present in the long-extraction flour.

The significance of these relations has an important bearing upon the nutritive properties of flours which are made by increasing the content of the low-grade and feed portions of the wheat berry. By way of illustration, suppose we compare two flours, one of 60 percent and the other of 75 percent extraction. The first, according to the accompanying curves, will contain approximately 8 percent of the total wheat thiamine and 20 and 10 percent, respectively, of riboflavin and niacin. In the 75 percent flour these values will be increased to 28 percent for thiamine, 31 percent for riboflavin and 16 percent for niacin. In other words, the extension of extraction from 60 to 75 percent has more than trebled the percentage of total thiamine while the contents of the other two vitamins have increased by only about 50 percent. Thus the benefits of higher extraction flours lie primarily in their increased content of thiamine. If extraction is increased to 85 percent, the increase in the percentage of total thiamine is approximately nine-fold, while that of riboflavin and of niacin is each about three-fold, or one-third as much.

Other Factors

In addition to thiamine, riboflavin and niacin, wheat contains other factors such as pantothenic acid, pyridoxine and biotin. Very little is known about either their nutritional roles in the human dietary or their distribution in wheats and products of milling.

Elvehjem and his coworkers have reported values which indicate that patent flour is much less devoid of these vitamins than it is of thiamine and niacin, since the concentration of pantothenic acid and pyridoxine is approximately half of that found in whole wheat.[2] Their values for the pantothenic acid content of a set of mill samples[3] have been calculated in terms of the percent distribution, and are shown in the chart. The relatively high pantothenic acid content of a refined flour is seen in the fact that 60 percent of the wheat contains nearly 30 percent of the total pantothenic acid, a considerably larger proportion than thiamine, riboflavin or niacin. Highest concentrations occur in the feeds, especially the bran, and for this reason, the increase which accompanies increased extraction is small until the branny tissues are included. As in the case of niacin, the germ tissues are not particularly rich sources of pantothenic acid and fall appreciably below bran.

Location Determined by Studies

To obtain some basis for the observations made on the products obtained by milling, several investigators have made a direct examination of the wheat kernel. About 20 years ago, Mendel and Bell[4] attempted to settle the controversy

* From a paper presented at the 1943 meeting of Cereal Institute at Minneapolis, Minn.

over the location of vitamin B in wheat. One school of thought insisted that the germ tissue was the sole source of this dietary factor, while another expressed the belief that the aleurone tissue lying just beneath the bran also made appreciable contributions. Using mice for test animals, these investigators assayed a set of mill fractions. Their results were in surprisingly excellent agreement with those obtained recently by more specific methods. By hand-dissection they removed the wheat embryos and assayed the products. Once again their conclusions that germ itself contains about one-sixth of the total vitamin B agrees excellently with recent findings.

Their third study compared the two halves of the wheat berry and showed that the germ and beard ends were essentially equivalent. This observation is quite different from that made by Whiteside at the Central Experimental Farm in Ottawa, who carried out thiamine analyses on three equal parts of wheat prepared by cutting the berry crosswise.[5] More than 80 percent of the total wheat thiamine was found in that third which contained the germ. Whiteside concluded that the major sources of thiamine are the germ and the tissues immediately adjacent to it. This observation agrees with that made in 1920 by Voegtlin and Meyers, who stated that vitamin B resides largely in the portion containing the germ.

Our own studies confirm those of Whiteside. The germ-third is nearly nine times as concentrated in thiamine as the other two-thirds of the wheat kernel. When the separation is carried further by cutting the germ-third in half, lengthwise, so that one portion contains all the germ, a further concentration of thiamine is discerned. Each fraction represents approximately one-sixth of the wheat kernel. That containing the germ has a thiamine content nearly equal to that of pure germ, while the non-germ part has about two-thirds the thiamine content of whole wheat. Since the germ content of this one-sixth portion of the wheat kernel is low in comparison to the other tissues, it is apparent that certain non-germ tissues surrounding the germ are highly concentrated and contain a large fraction of the total wheat thiamine. Actual milling operations have yielded products which exceed by 50 percent the thiamine content of pure germ. This explains the thiamine values obtained in flours of long extraction when such tissues are included with the endosperm.

Similar, but less complete, studies have been made of riboflavin and niacin. No such great differentiations were observed. Table I shows the results obtained when the kernels are cut in half crosswise.

TABLE I—Vitamin Content of Wheat Kernel Halves.*

	Beard half (mg./lb.)	Germ half (mg./lb.)	Ratio germ half to beard half
Thiamine	0.82	4.76	5.80
Riboflavin	0.32	0.58	1.81
Niacin	28.15	28.58	1.01

* The beard half constituted 51 percent of the wheat kernel, the germ half, 49 percent.

Somewhat more riboflavin is found in that portion which contains the germ. To a considerable extent this can be accounted for by the higher content of the germ tissue. In niacin content there is no measurable difference between the germ and beard halves. No concentration in or about the germ exists, and distribution appears to be confined to a rather uniformly graded increase from the inner endosperm to the outer bran.

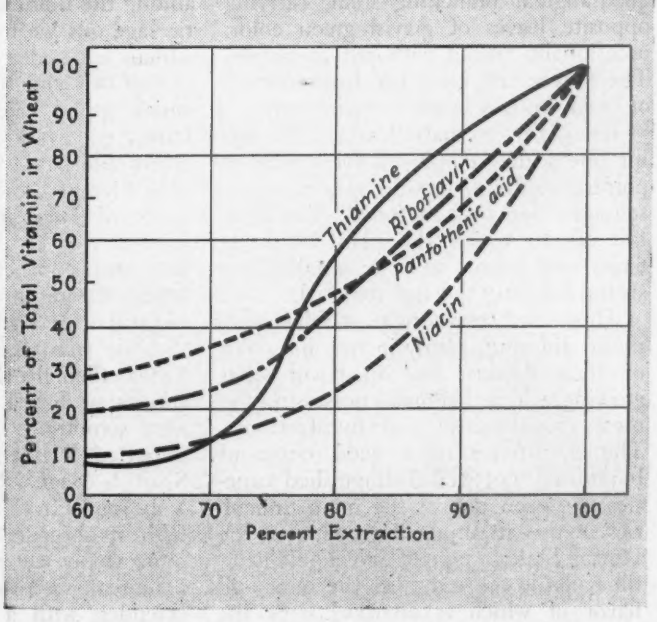
Total Vitamin Content Varies

Not only does the vitamin content of different parts of the wheat berry vary, but there is wide variation in the total vitamin content of the berry. Thiamine varies from 1.4 to 3.5 mg. per pound in pure wheat varieties. Soft wheats tend to be lowest and spring wheats highest. But the same wheats grown in separate locations show large differences, and in many instances an appreciable varietal effect has been observed. In addition, differences have been observed from one crop year to the next.[6] This greatly complicates the picture and adds to the difficulty of evaluating wheats. From a practical standpoint, however, these thiamine differences are not of major concern, since in a large measure they are minimized by the blending which is done in the country elevator and by the miller. Commercial wheat mixes are much more uniform. A survey of whole wheat flours obtained from scattered sections of the country shows an average thiamine value of practically 2.25 mg. per pound, with normal variations of less than 15 percent.

Riboflavin stands in rather striking contrast to thiamine, being present in surprisingly constant amounts. Influences of type, variety and environment are relatively minor, since most samples vary only about 10 percent from the average value of 0.55 mg. per pound.[7]

The third factor, niacin, apparently occupies an intermediate position, at least as far as natural variations are concerned.

The available data show some variations but not to the extent exhibited by thiamine. The best present average figure greatly exceeds in quantity those for thiamine and riboflavin, since the value is approximately 27 mg. per pound.[7]



How vitamin content is affected by the percent of extraction in flour milling.

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Harvesting sage on an Idaho farm in July, 1942.

U. S. Production of Oil of Sage

By ERNEST S. GUENTHER
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PART I—Sage, one of the most important flavorings used in the food industries, has always been imported from the Mediterranean area. Since the war stopped imports, growth of sage and production of oil of sage have commenced in the U. S.

THE sage plant, *Salvia officinalis L.* (fam. *Labiatae*) is a hardy, perennial, low shrub or sub-shrub, with a quadrangular branching stem, carrying opposite leaves of grayish-green color, occasionally tinged with red or purple. The flowers are blue; the fruits consist of black nutlets borne in open cups.

The highly aromatic leaves, after drying, are widely employed for seasoning poultry stuffings, ground meats, soups, sausages, and canned foods. The volatile oil, to which the plant owes its flavor and aroma, may be obtained by steam distilling the leaf material.

There exist several types of *Salvia officinalis*, differing mainly in size and color of their flowers, and in flavor—that growing wild in Dalmatia possessing the most characteristic and finest aroma. The occurrence of a wide range of botanically not well distinguished varieties has been one of the main difficulties in the attempts of growing in the United States a type of *Salvia officinalis*, the volatile oil and thus the odor and flavor of which is identical with the imported Dalmatian kind. Climatic and soil conditions, and methods of harvesting too, contribute to the hazards of producing, in the Western Hemisphere, the desired type of plants. In fact, among the numerous samples of domestic sage oils we found only one or two which had odor qualities fully equal to that of Dalmatia. *Salvia leucophylla*, which grows wild in California, contains a good percentage of camphor and cineol and has, therefore, a strong odor indicative of these constituents. If the leaves of *Salvia leucophylla* are ground and allowed to stand for a period of time, the odor of cineol and camphor fades, leaving a residual note that is suggestive of Dalmatian sage.

Aside from the different varieties of *Salvia officinalis* there exist several other species of Salvia, the leaves of which were sometimes used as adulterants of imported Dalmatian sage, for instance, Spanish sage, *Salvia lavandulaefolia* Vahl, and Greek sage, *Salvia triloba* L., with its broader, thicker, shorter and more wooly leaves. The odor of these perennials resembles rosemary and spike lavender, with a harsh camphoraceous "bynote."

The so-called Cyprus sage, which originates from the island of Cyprus in the eastern Mediterranean, may be a form of *Salvia officinalis*, but is of inferior quality.

Habitat and Range

Salvia officinalis L., the true Dalmatian sage, grows spontaneously in the form of low bushes and tufts on the bold, rocky, barren and sunny hillsides of the Dalmatian Islands and the adjacent coast of the Adriatic Sea. Parts of this island world belong to Italy, parts to Yugoslavia. In a previous paper, the writer[1] has given an account of this industry, based upon a personal survey. The gathering of the plant material is a rather tedious and delicate task, as not all leaves are desirable. If the cutting is not done properly, the plant is likely to perish and therefore harvesting machines are not employed in Dalmatia.

The Dubrovnik district produces the best quality of aromatic sage plants. In that region, harvesting starts as soon as the plants are large enough, early in June, and continues during the dry weather up to about early September. Some shippers never pick any sage leaves after the rains start. The harvesters, now mostly women and children, pick the leaves by hand just like the tea pickers in Japan. The young plants, before flowering or going into seed, are preferred because they contain the largest amount of oil and the finest

aroma. These leaves are placed on large canvas sheets by the individual packers and, every day, taken to the drying yards in each locality where they are thoroughly dried in the sun and carefully stored in large bags. From the drying sheds the leaves are taken down to Dubrovnik where some of the shippers have large warehouses. The leaves must be checked and re-picked to make sure that they contain no foreign matter before the final packing for export. By these precautions, the exporters of Dubrovnik are able to ship the best quality of leaves.

In other districts, it is customary to cut the whole plants with small sickles and to dry them on the ground in the open. When dried, the top part of the plants are broken off or they are stripped. This method, however, produces large amounts of stems and foreign matter to which the United States Department of Agriculture objects.

Part of the collected plants are distilled locally for their essential oil, which in late years has increasingly replaced the leaves in the flavoring of packed food products; the bulk is further dried, the leaves carefully removed and assorted into different grades for export. Nine pounds of fresh leaves give about two pounds of dried leaves.

Many attempts have been made to cultivate *Salvia officinalis* in the Western Hemisphere, as a garden crop and on a large scale. It is comparatively easy to grow, except in the very dry and warm regions, and once established persists for several years.

According to Crooks and Sievers[3], sage withstands winter temperature to zero, and even below, provided some protection is offered by snow, or a covering of leaves or straw. Temperature and rainfall in the cornbelt states are more or less ideal for sage culture. Regions with high summer temperatures and long dry periods are not desirable for food growth and a good quality of sage. Even in the cold, moist regions of the northern United States, where the winters are severe enough to winter-kill, sage may be grown as an annual, but the profits from such a crop would be very doubtful, even with unusually high prices.

Sage grows well in the regions from Wisconsin south to central Georgia, and throughout the eastern coastal states. In extreme northern parts of the United States, especially where the land is not well-drained, too much winter-killing occurs for sage to become a perennial crop. The possibilities for the production of sage, under irrigation, are not known. A hot, dry climate usually develops a product of inferior quality.

As far as soil is concerned, sage grows in a wide range of fertile soils, provided they are well drained and sufficiently supplied with nitrogen. The best soil, however, is a rich, clayey loam. The plant does not thrive so well on a very light, sandy soil as the earth is easily splashed by rain to the lower leaves. The leaves are covered by a layer of very fine hair in which the sand is readily held to the extent that the product may be unsuited for the market. Good drainage is very important if sage is cultivated as a perennial. An abnormal amount of moisture in the soil, during freezing weather, results in excessive winter-killing in the cold climate of the Northern states.

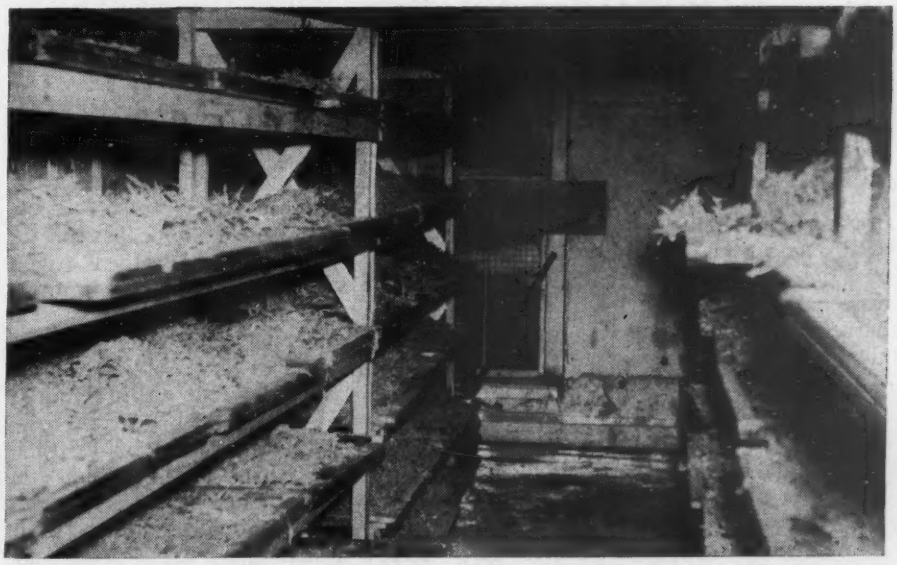
Planting, Cultivating, Harvesting and Preparing for the Market

Stockberger[2] recommends that for cultivation on a large scale, the seeds be sown in early spring, in rows from 2 to 3 feet apart; when well up, the plants are thinned to stand about 12 inches distant in rows. Seedling plants have a tendency to produce narrow leaves; hence, the broad leaved varieties, which do not flower readily, are claimed to be the most desirable ones, as they give a larger yield of leaves. Since the plants rarely set seed, they are usually grown from cuttings, which may be obtained from seed houses having their own propagating gardens. Cuttings set as early in the spring as weather conditions will permit usually give a large crop. In the North, the plants should be protected in winter by a mulch of manure. Sage may also be grown as a second crop, after early vegetables.

A fair crop of leaves may be harvested the first season, and a much larger one for five or six years following. Only one picking should be made the first year, after which two or three pickings may be made in a season, provided the climate and weather permit the plants to survive. If a product of fine quality is desired, the leaves are picked by hand and dried in the shade; drying in the sun is not to be recommended. Sage leaves are apt to turn black while drying; therefore the moisture must be removed continually until they are fully dried. A cheap grade may be obtained at a smaller harvest cost by cutting the plants with a mower, the cutter bar of which is set at such a height as not to include the woody stems. The dried herb should be marketed promptly, since it loses its flavor strength rapidly with age.

According to a private communication from Dr. A. F. Sievers, Senior Biochemist, Beltsville, Md., the growing of sage from seed results usually in a mixture, as *Salvia officinalis* occurs in a wide range of types. The Bureau of Plant Industry Station in Beltsville succeeded in selecting from an experimental crop of seedlings a number of types which had a very good flavor, whereas others were either suggestive of camphor or turpentine. Thus, the proper way to grow sage, if a uniform and good quality is desired, consists in making cuttings from a desirable type and in eliminating thereafter all the other forms that are found among the seedlings.

Crooks and Sievers[3] recommend to plant sage in rows, 2 to 3 feet apart, the plants spaced 6 to 12 inches in the rows. Seeding may be direct to the field, or the plants may be started in a coldframe or greenhouses and transplated in the early spring. The cost and availability of the seed and the im-



After cutting, the sage leaves are dried on trays stacked in an artificially heated and ventilated room.

portance of getting a maximum crop the first year are determining factors as to which method should be used. If sown directly in the field, the seed should be planted about ¾ in. deep in the early spring, as soon as the ground is warm enough for germination. The plants are later thinned to the desired spacing. The first year crop, by this method, would be very light. By sowing the seed in a coldframe or hotbed, the seedlings could be transplanted to the field by hand or set by an ordinary transplanting machine, as used for tobacco or any vegetable crop. One pound of good viable seed, grown in a coldframe, should produce from 12,000 to 20,000 seedlings, which is sufficient to plant an acre with ordinary spacing. Cultivation should be light and thorough; weeds should be kept from the field because the final, dried product must be free of any foreign matter that might give an undesirable flavor.

Only the leaves and the small stems of the sage plant are prepared for the market by either handpicking or by cutting with a mower and by stripping the leaves from the stem. Either method involves considerable hand labor; however, it is likely that cutting with a mower, and then hand stripping to remove the dried stems, will prove much more economical from the standpoint of labor involved.

Drying may be hastened by a slow fire in the drying shed or common tobacco drying barn. The dried sage is baled and marketed in this form.

Yield

According to Crooks and Sievers[3], the yield in the first year depends on many factors, although approximately 200 to 600 lb. of dried sage leaves per acre may be expected. Much would depend upon getting good seedlings planted early in the spring and favorable growing conditions in the early part of the season. Under advantageous conditions, the second year should yield from 1,500 to 2,000 lb. by making two or three cuttings of the crop.

According to Stockberger[3], returns from experimental areas indicate that, with a good soil, a yield of 2,000 lb. or more of dried tops per acre may be expected. In case the leaves only are harvested, the yield will be proportionally less.

Considerations of Domestic Production

Much has been said and written, since the outbreak of the war, in favor of growing sage as a highly remunerative domestic crop. Crooks and Sievers[3] give an unbiased and interesting account of the pros and cons which must be considered before starting on any such venture.

ERNEST S. GUENTHER

The following aspects are in favor of domestic sage production:

(1) Considerable cash income for American farmers could be realized if the 1,500,000 lb. of sage consumed in this country each year were all produced here. This quantity would require approximately 1,500 acres. To this must be added another 500,000 to 600,000 lb. of sage which formerly entered the United States as distilled oil.

(2) With high prices and good growing conditions it should be possible to realize some profit from the first year's crop in addition to paying for the cost of establishing the crop.

(3) Small meat packing houses throughout the country are usually interested in the local production of sage and would probably take a local supply, even at a price somewhat higher than that for which foreign sage could be delivered in times of normal trade.

(4) Sufficient acreage is available that can be used for the production of a domestic crop.

(5) Sage can be grown in connection with some other crops, such as tobacco and possibly hops, in order to use equipment that is now at hand, thereby reducing the need for a large immediate investment. This equipment would be largely in the form of hotbeds, transplanting machinery and some form of drying barns or sheds.

(6) Under ordinary conditions, sage is a hardy plant and probably would not be seriously affected by disease and insect enemies.

Against these favorable factors, there exist some which tend to limit the domestic production of sage:

1. At present, only a small amount of seed is available, the asked prices making it almost impossible to seed out directly into the fields.

2. Sage, grown as a crop, involves a considerable amount of hand labor. Unless low-priced labor can be obtained, it is likely that the cost of growing and harvesting domestic sage would be far higher than the price ordinarily paid for imported sage. The nature of this crop makes complete harvesting by machinery unlikely. Also, small widely scattered plantings hinder the development and use of economical labor saving machinery.

3. There exist many varieties of sage; their identity is not well established and great variations occur, even within the variety. This condition has actually resulted in products being offered which are lacking in uniformity and which are undesirable in regard to odor and flavor. In fact, some discrimination against certain types of domestic sage has already developed.

4. There is a good possibility that an abundance of foreign sage will be offered on the market at a low price as soon as normal trade is again carried on with the Mediterranean countries. This is likely to be true because sage grown as a perennial is, at present, probably not being harvested abroad in the usual amounts. The increased size of the plants thus resulting will probably make the herb available in amounts greater than the annual production in normal times. This, quite likely, holds true also with the essential oil of sage distilled in Dalmatia, stocks of which are probably accumulating abroad.

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Part II of this article, discussing the physical and chemical properties of oil of sage and its applications, will appear in an early issue of FOOD INDUSTRIES.

War Boosts Production Of Domestic Paprika

By JAMES H. COLLINS, Hollywood, Calif.

California industry reaches 10,000,000 lb. annual volume in ten years. Growers have developed a product which in color, blandness and fineness is comparable to imported paprika

WHILE imports of paprika powder have not been entirely cut off by the war, a shortage in supply has given impetus to the domestic industry centered around San Juan Capistrano in California. Growers and processors, striving to improve the quality of the native product and to increase output, cannot meet the demand of industrial buyers, and very little California paprika is marketed in consumer-size packages.

However, the industry is not a "war baby." One of the pioneer experimentalists in the field, Clarence R. Brown, in 1931 sent to Hungary and Spain for paprika seed. Pepper farmers in the San Juan Capistrano region were losing their business in sweet pimiento peppers for canners to Georgia farmers, who enjoyed advantages in labor and freight rates. Brown believed that with imported seed his district could raise the bland, thick-fleshed peppers used for paprika, and as the district still had its chili pepper market—it produces most of the chili used in the country—the pepper grinders in Los Angeles were equipped to manufacture and market paprika.

Before the California industry reached its present volume of over 10,000,000 lb. yearly, innumerable technical difficulties had to be overcome. As a food color, paprika has the status of the permitted food dyes, rated harmless and free from labeling restrictions. It is comparable in price to the dyes, and differs from competitive colorings chiefly in containing a little less natural oil. No oil is added to the powder. It is readily dispersible in water. Yet paprika holds its own place with food processors who have standardized on it as a coloring and are concerned with three points of quality—color, blandness and fineness.

Color is largely determined in buying the dried peppers from growers. The grinders hold to a tintometer range between 23 and 28, and if the grower has harvested and dehydrated his peppers within that range, the grinding process does not affect the color.

Hotness is also a hazard for the grower, because paprika stock is raised in the same general region of southern California where the chili pepper crop has become a staple, and cross pollination from hot peppers can ruin paprika. The grinders test for hotness by tasting. Blandness is all-important in household paprika, where it can be tasted in itself, but hotness could also alter the flavor of commercial food products in which paprika is used.

The fineness of grind is considered a matter of personal preference among technical users, and some of the grinders cater to it, others do not. It runs from 60 to 72 mesh, with grinders who market one grade adopting a fine mesh. Fine grinding has the advantage that the material will contribute its color more effectively in food processing.

For a permanent paprika industry, the grinders must have a dependable supply of dried pepper stock, and for that reason they have worked closely with the growers in solving the problems that determine quality, which depends largely on the cultivation and farm drying of the crop.

Domestic paprika as packed for a New York department store.

Dehydrating Paprika

Dehydrating is now the chief concern of growers, who say you have to raise paprika to appreciate the beautiful quality that has been developed in the imported product. For drying peppers, the growers use the counter-current California prune dryer.

The condition of the peppers must be taken into account, and the temperature, volume of heated air, velocity and time have to be adjusted accordingly. The average run is 21 hours at 140 deg. F., under 50,000 to 60,000 cu.ft. of heated air per minute.

Domestic Improvements

The quality of imported paprika is credited to the labor of European peasant families, who raise small garden plots of peppers as a cash crop, and have many helpers to watch the sun-drying and turn the peppers until they are cured, safeguarding color. In contrast, California farmers grow acreage, pay standard farm wages and operate dryers. Their costs are higher and they must adapt crops to existing machinery. But they have made good progress. Last year, for example, Clarence Brown improved his drying technic with a new type of revolving drum. The pepper skin is relatively impervious to moisture, so in drying the water has to go out at the stem end. The revolving drum has a large number of sharp spikes which pass over the peppers, piercing small holes in each, to facilitate drying.

In 1940, paprika growers reported production costs of around $50 a ton for dried paprika stock, which was profitable. Today, the war has thrown all costs out of line. Normal prices for imported paprika range from 17 cents to 30 cents a pound, compared to present prices of from 28 to 37 cents. Approximately 5,000 acres of paprika is calculated as the production necessary to meet American demands. Growers have debated the establishment of central dryers to which the individual farmer would haul his crop, for handling by people who specialize in the process, as well as thorough washing and testing for spray residue. Not every grower favors central drying because of the distance and factors of freshness.

Probably more than half the output of California paprika goes to food processors. It is used chiefly as a coloring for chili con carne, catchup, sausage and meat loaf, where the delicate flavor is masked by stronger flavors. For the trade, paprika is packed principally in 220-lb. barrels or in 1- and 5-lb. packages.

Paper Is Scarce—Conserve It

Definite shortage of paper is clearly visible. So management must take further steps to conserve it. Here are suggestions

PAPER is a strategic material. Formerly it was taken as a matter of course. But so, once, were rubber, steel, copper and aluminum. Today a definite scarcity of paper is clearly visible. Its uses have increased vastly. Yet potential wood pulp production has been clipped by manpower and transportation limitations. And the war has chopped off Scandinavian imports.

Industrial managements are among the consumers who can least afford to take paper for granted. Think it over. An absolute lack of paper could all but stop a plant cold. Without paper packaging materials, most food manufacturers could not move any finished products out of their plants. Without letterheads, you can't write for quotations. Without purchase forms, you can't place orders. Without time cards, payrolls, employment records, continuous forms, memoranda, blueprints, and so forth, it would be well-nigh impossible to keep the plant or office running.

Yet in the case of commercial paper alone—and this is the type most needed for management's purposes—1943's huge demands will outweigh the prospective supply by nearly 40 percent. Worse, still, rising governmental requirements will leave for industry in 1943 an amount equal only to about 50 percent of its 1942 consumption.

Were it not for the fact that great savings have already been made by industry, by newspapers and magazines, by the government, and by WPB's curtailment of less essential paper products, many experts believe we would now be gripped by an unprecedented and crucial shortage.

Offsetting the greatest savings, however, are war's tremendous new demands. Vast quantities of paper are being shipped overseas, never to return to the domestic wastebasket.

Meanwhile, the forward march of war-born substitution goes on at home. Each takes a mighty share of our total wood pulp supply. Paper and paperboard containers have, in the last year, done the duty of 215,000,000 lb. of metals, 750,000 lb. of glass, and 12,000 lb. of rubber.

Convinced, then, that a serious shortage impends, good management will ask only two questions:

1. What is being done to conserve paper?

2. What can be done to conserve paper in the plant and office?

Some of the most spectacular savings of all have already been accomplished by the Federal government itself. Strange as this may seem to the management man whose own dealings involve such a heavy paper traffic with Uncle Sam, the Federal agencies have reduced inventories, trimmed specifications, and cut out nonessentials with total savings that run into the hundreds of thousands of tons.

How to Save

At all events, the government takes only about 10 percent of the total wood pulp supply, even though its consumption of commercial paper is a lion's share of that particular market. Since industry consumes *all* kinds of paper, and paper products, let us see what savings are being made elsewhere—and by what methods.

The business and industrial publications (magazines such as FOOD INDUSTRIES) have reduced their use of paper by at least 10 percent, and probably will make further curtailment in the near future. The trim sizes have been lessened, and stock of much lighter weight is being used. These reductions, proposed by the publishers themselves, are being accurately checked by a duly constituted agency. Even without reductions, the total consumption of paper by the business publications was a remarkably small part of all paper consumption—less than four-hundreths of one percent.

An outstanding example of the ability of private enterprise to conserve is furnished by this year's telephone directories. The Washington, D. C., telephone book is a good case in point. Currently it numbers only 712 white pages, against last year's 968, and it weighs only 3⅜ pounds, against last year's 4¼. *Yet it contains 7 percent more listings!*

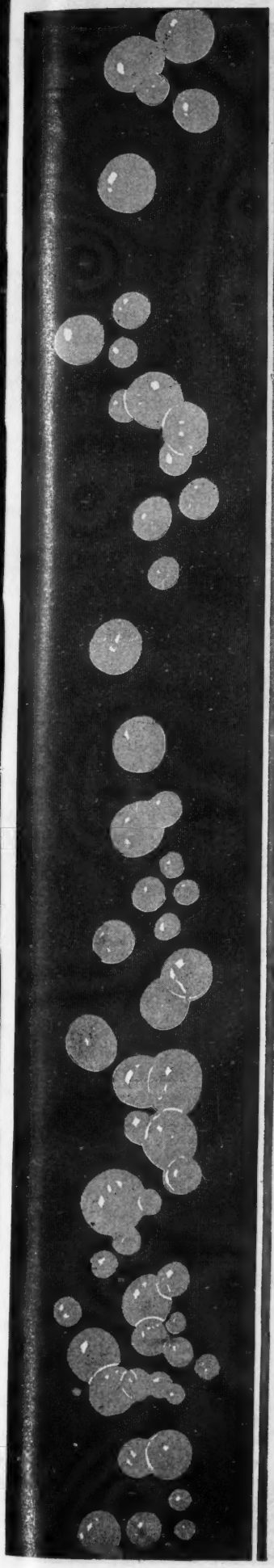
An important principle in the conservation of commercial paper is the *downgrading* of paper qualities. Experts believe that the majority of papers used in the keeping of industrial records and correspondence are much heavier and better than they need be for the purposes they serve. This is true also of plant magazines and newspapers, Army-Navy E award programs, circulars, and the like. And it may be true of some domestic food packages. Here are five guiding questions which every management should ask about every piece of written or printed matter which it orders and uses:

1. Is it necessary?
2. Can lighter paper be used?
3. Can a smaller size be used?
4. Can the number of printed pieces be reduced by pruning distribution lists?
5. Is an excessive inventory of paper on hand? (Sixty days is today's allowable margin—six months the peacetime average).

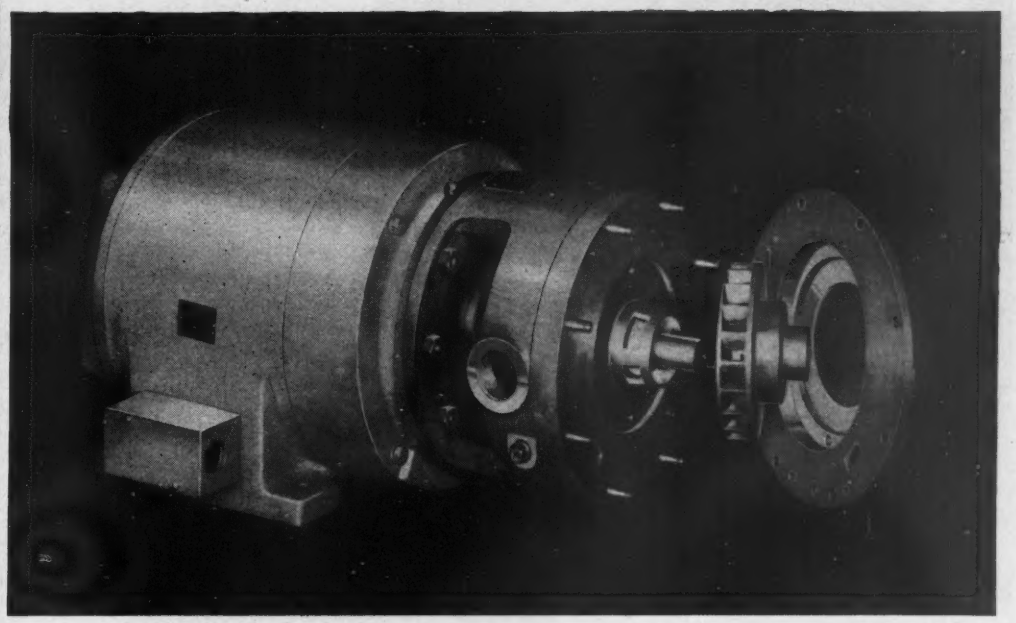
War Production Board officials urge every top management to make a competent operating executive responsible for the application of these principles in each plant. And here is a brief check-list for the further guidance of the paper-saver:

1. Use 8½ x 5½-in. letterheads for short letters; inclose them in small envelopes.
2. Review all printed forms periodically for essentiality; consolidation; elimination of waste space; standardization of sizes, weights, color, grade; elimination of color where possible.
3. Use smaller type sizes and margins. (Any competent printer, in consultation, can point the way to pronounced savings by these means.)
4. Cut the weight of paper stocks. (You tell the printer how long you expect a record to endure and he can tell you what stock to order.)
5. Condense letters and memoranda by (*a*) keeping margins as narrow as possible; (*b*) sticking to single-space forms; (*c*) using reverse side of incoming letters as first carbon copy of replies; (*d*) using reverse side of second sheets for carbon copies; (*e*) using both sides of all mimeographed sheets.
6. Control disbursement of paper supplies to employees so that excessive quantities do not accumulate in desks and departmental supply closets.
7. Make scratch pads from stocks of obsolete letterheads, memorandum forms, and other unused inventory.
8. Use and reuse carbon paper consistently.
9. Avoid over-packaging of food products.

The above list could be a little more elaborate. But any management which adopts these few simple practices will be covering nine-tenths of its opportunities to conserve a very important commodity at a very important time.



ONLY CLEAN AIR CAN REACH YOUR PRODUCT FROM A NASH COMPRESSOR



Here is a compressor designed perfectly to meet the needs of the Food Plants. It is simple, for it has only one moving part, a rotor cast in one piece and rotating in the casing without metallic contact. This means trouble-free operation over long periods. It is compact and requires little valuable floor space. Its oversize ball bearings seldom require attention or lubrication. No lubrication is required in the interior, so that the air is kept clean from the time it enters the pump. • But this is not all. The compressing medium in the Nash Pump is a rotating column of clean water. The air is in intimate contact with this water in passing thru the pump and is actually scrubbed while it is being compressed. Dust present in the atmosphere is removed, and the air delivered free from dirt, oil, or heat, without the use of scrubbers or air washers. Think what this means in terms of purchase cost and floor space occupied by complicated air washing apparatus. • These pumps are proving their worth in the most trying service. They are ideal for transferring beer or wort from tank to tank by air pressure, for maintaining pressure on aging tanks, for supplying compressed air to bottling machines in racking, etc. • Available in any capacity, these pumps deliver pressures up to 40 lbs. absolutely uniform without storage tanks. • You want the most reliable pumping equipment in your plant, so by all means find out more about the Hytor. Our catalog No. 217 is free on request.

THE NASH ENGINEERING COMPANY

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NEW PACKAGES & PRODUCTS

Soya Scores Two Hits

INCREASING importance of soya products is evident all over the country, with sales shooting upward in retail markets. Two meritorious new soya foods recently have come to our attention: "Stoy" soya flour, processed by A. E. Staley Mfg. Co., Decatur, Ill., and Miller's "Soya Spread," packed by International Nutrition Laboratory, Mt. Vernon, Ohio.

Now being offered in test markets, Stoy soya flour promises to make the best seller list. It is a special high-protein food made by a new process, rich in B-complex vitamins, calcium, phosphorus and iron. One pound of the product is said to equal the protein value of either 2½ lb. of lean meat, 2 lb. of American cheese, 7½ qt. of whole milk or 36 medium-sized eggs. Stoy can be used in meat loaf, patties, bread, muffins and pastry.

Miller's Soya Spread is a protein sandwich filling which may be used as it comes from the can, or blended with mayonnaise, chopped nuts, olives or other relishes. Ingredients are soybeans, tomato puree, vegetable oil, soya sauce, vegetable seasoning, onion and sea salt, packed in a 13-oz. tin.

Container With a Purpose

SHAPED like a pitcher with a broad base, tapered sides and a convenient handle, the glass container for Maison Royal "Kof-E-Ade" has many reuse possibilities. The sturdy construction and embossed leaf design make a container that easily could be used for salad dressings, vinegar or sirups.

Whitehall Food Mfg. Corp., Brooklyn, N. Y., is marketing the imitation coffee flavor base, made from coffee flavor, caramel color, maltose-dextrose - dextrine, tonka bean extractives, imitation flavor, propylene glycol, alcohol and water. Unlike most coffee substitutes, Kof-E-Ade is a liquid formula. For each cup one teaspoon or more of the base is used.

Chocolate Peanut Butter

FROM Hollywood, naturally, comes peanut butter flavored with chocolate, that can be used alternately as a spread or as a nourishing drink, mixed with hot milk. "Choc-O-P'nut But'r" is packed by Elizabeth Moté, Hollywood, Calif.

The chocolate-colored, vitamin-enriched product contains peanuts, granulated sugar, water, corn sirup, dextrose, cocoa, chocolate, salt and vitamins B_1 and B_2. Two tablespoons of the peanut butter spread are reputed to comprise 50 U. S. P. units of B_1 and 250 micrograms of B_2.

Breakfast Food or Dessert

"APPELLA CRISPS" processed by Appella Corp., Seattle, Wash., is a welcome addition to wartime menus, serving as a breakfast food, applesauce, in puddings, cakes or other desserts. The versatile product is made from pure dried apples, the equivalent of 16 average-size apples, cored and peeled, being packed in each 4½-oz. can.

The dehydrated Appella Crisps must be kept tightly closed in the tin to retain their crispness. Packed in a tall, key-opened can, the crisps present an easy way to get your apple a day.

Cream Stiffener

SHORTAGES in whipping cream have caused the appearance in consumer-size bottles of several whipping aids, long used by restaurants and hotels to stiffen light cream. Meyer & Lange, New York, N. Y., is distributing a 4-oz. bottle of "Au Gourmet Whip'O," which contains sugar, water, lime and Epsom salts.

EVER TRY TO *BEND* A BOTTLE?

Yes THERE'S A DIFFERENCE IN GLASS

EVEN some experienced glass buyers have fallen into the habit of thinking that all glass is pretty much the same—that the only important difference in bottles and jars is in their design. But the truth is that glass itself can vary tremendously.

For example, glass will bend. If you doubt it, simply take a bottle and fill it with water. Cap it and insert a glass tube through a hole in the cap. Then squeeze the container. You'll see the water forced up in the tube because the glass is actually *bending*.

Some glass bends only a little. Other glass is more flexible. The extent to which you can bend a glass container does not in itself mean that the glass is good or bad. It has some effect, of course, on the service that you'll get from it. But its real importance lies in the fact that it proves a point—the point that there is a difference in glass.

And it's the combination of dozens of these little differences, differences in composition, distribution, color, things you probably never thought about, that makes the difference between ordinary glass and top-quality glass.

So remember—just because today's glass packages look alike doesn't always mean that they are alike.

For the interesting story of how fine glassware is made, write for your free copy of Armstrong's booklet, "Men and Glass." Armstrong Cork Company, Glass and Closure Division, 4208 Prince Street, Lancaster, Pa. Glass plants at Millville, N. J., and Dunkirk, Ind.

ARMSTRONG'S GLASS

and **ARMSTRONG'S CLOSURES**

SINCE MOST CONTAINERS LOOK THE SAME THE CAP'S THE PLACE TO PUT YOUR NAME

WAR has put many familiar brands into unfamiliar packages. What's more, today's shoppers have less time to spend searching shelves for old favorites. If they don't find the brand they prefer, right away, they're likely to buy the first alternate they see.

That's why it will pay you, today more than ever before, to put your trade-mark or name—in color—on lithographed Armstrong's Metal Caps. You'll make it easy for even the most harassed housewife to locate—and buy—your brand. And you'll remind her of your name every time she opens and re-opens the package.

Why not find out right away how economical it is to add this trade-mark insurance to your package? Send us your wartime glass container and the trade-mark or name you're using, and we'll return your package with our suggestion for a modern, eye-catching cap design. There's no obligation.

If you have any other wartime glass packaging problems, we'll be glad to offer suggestions on them, too. Write Armstrong Cork Company, Glass and Closure Division, 4208 Prince St., Lancaster, Pa.

The Army-Navy "E" and Star have been awarded to the men and women of Armstrong's Closure and Floor Division Plants for excellence in the production of such war materials as cartridge cases, shells, incendiary bombs, and camouflage.

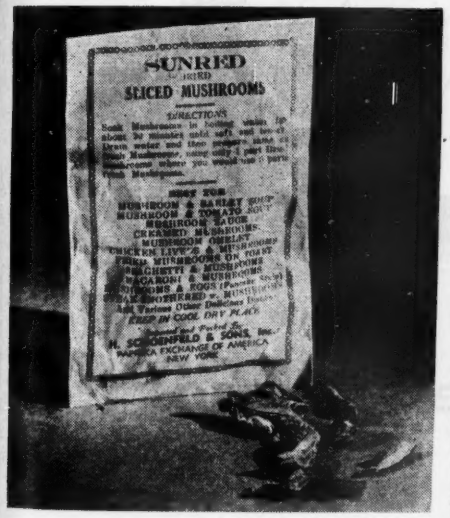
Armstrong's Closures

TURN STANDARD CONTAINERS INTO STANDOUT PACKAGES

One teaspoonful of Whip'O is added to ice-cold light cream that is at least 36 hours old, and the mixture whipped until stiff. Flavor can be added if desired. The Meyer & Lange product is packed in a tapered glass bottle with a plastic screw cap.

Dehydrated Mushrooms

SLICED, "Sunred" dried mushrooms are imported and packed by H. Schoenfeld & Sons, Paprika Exchange of America, New York, N. Y. Packaged in a waxed



glassine envelope, the handful of dried mushrooms can be used in soups, sauce, with omelets, spaghetti or eggs, in much the same way as fresh mushrooms. The product should be soaked in boiling water for about 30 minutes before using; one part of dried mushrooms is used where five parts of fresh mushrooms are required.

Meat Extender

ADD TO the growing list of food extenders "Milani's Base Mix" for meat loaves, hamburgers and other meats. Manufactured by the well-known Louis Milani Foods, Inc., Chicago, Ill., the base mix is a blend of bread crumbs, salt, flour, wheat protein derivatives, artificial flavor, dextrose, beef extract, spice and dehydrated vegetables. No salt or seasoning is necessary.

The base mix can be used for breading and stuffing, or the 4-oz. contents of a package mixed with 1 lb. of ground meat and 12 oz. of water to make a

meat loaf. Milani's package for the mix is a glassine envelope laminated to white paper and stapled.

Goat's Milk Powder

FOR those who like it, goat's milk powder is now available in dry powder form, distributed by King's Goat Milk Laboratories, New York, N. Y. To make a drink approximating one glass of goat's milk, two heaping teaspoons of the powder is added to a glass of water.

Addicts, and there are said to be many, may also take the powder in dry form with beneficial results.

G.H.Q.

for *all* types of paper packagings for any food product

Who are we? . . .

• We're a firm of specialists, designers and suppliers of special-purpose paper packagings, not limited to any one or any group of materials but working with all—cellophane, glassines, transparent and opaque papers—in all types and laminated combinations—with and without heat-sealing features, thermoplastic or other coatings.

Whom do we serve? . .

• In the food field we are supplying the packages for many food packers, large and small, packaging both to government specifications and for civilian use. You'd be familiar with many of their names.

How can we help you?

• As suppliers of any type of paper package, we can furnish comparative data on all eligible materials and constructions; can save you much time "shopping" from source to source. We can make recommendations—absolutely without bias. We can help you make your own tests and comparisons of materials. As either your basic or supplementary source of supply, we can give you efficient service, assured quality, and the price benefits of our large-volume selling.

Write—describe the product you package—give the size package required or quantity packed—quantity of packages used. We'll send samples, prices, all relevant information. And, there's no obligation.

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Consult one of the world's largest makers of vitamins—Hoffmann-La Roche, Inc., Roche Park, Nutley 10, N. J. Address: Vitamin Division.

ROCHE

FSA States Government's Policy on Enrichment

Intended as guide to food manufacturers who add or intend to add nutritive ingredients

As a matter of formal record, the Federal Security Agency has promulgated a "statement of policy with respect to the addition of nutritive ingredients to foods." This is intended to guide any food manufacturer who now or later wishes to add vitamins, minerals or other special nutritive ingredients, to restore foods to natural condition or to enrich them. The following is the official text as published on July 3:

"The labeling or advertising of a food as enriched with vitamins and minerals is an implied promise to consumers that it contains, in addition to the normal constituents of the unenriched food, sufficient vitamins and minerals to make a substantial contribution to the nutritional welfare of persons eating the enriched food in customary amounts. In order to promote honesty and fair dealing by fulfilling this implied promise, it is necessary that the kinds and quantities of enriching ingredients be determined in the light of deficiencies of the various nutritional factors in the diets of the population in general and of significant population groups, the place occupied by the food in such diets, and the suitability and effectiveness of the food as a carrier of the enriching ingredients without undue separation or loss before consumption.

"Honesty and fair dealing will best be promoted if such enriched foods as are made available to consumers serve to correct such deficiencies and furnish a reasonable margin of safety. Enrichment above the levels required to accomplish this end is wasteful and contrary to the interest of most consumers; nutrient factors in concentrated form are available for use in those special cases of deficiencies in the diets of persons who do not constitute significant population groups. Enrichment of foods with nutrients that are supplied in adequate quantities by the diets of all significant population groups is not only wasteful but tends to confuse consumers as to their nutritional needs.

"Knowledge of the roles in human nutrition of various components of food, particularly the vitamins, is incomplete. There is reason to believe that as new information is developed food factors not now recognized as essential may be shown to be necessary to adequate nutrition.

"Most natural foods contain a wide variety of needed factors in significant amounts. It is highly probable that a diet of unenriched foods so chosen as to contain the required quantities of the presently known needed vitamins and other factors would more nearly supply all needed factors, known and unknown, than a diet which is raised by enrichment to adequacy in the vitamins and minerals now known to be needed.

"Even though adequate nutrition could be better assured through the choice of natural foods than through reliance on enrichment, unenriched foods of the kinds and in the quantities necessary for adequate nutrition are not now available to substantial parts of the population and are not likely to be available soon; nor are most consumers sufficiently educated on nutritional questions to enable them to make an intelligent choice of combinations of unenriched foods on the basis of nutritional values.

"Because of the lack of adequate production of a number of foods high in certain nutrients and the lack of consumer knowledge of nutrition, appropriate enrichment of a few foods widely consumed by the population in general or by significant population groups will contribute substantially to the nutritional welfare of consumers and to meeting their expectations of benefit. Enrichment of those foods which are not a substantial part of the dietary of any significant group tends to confuse and mislead consumers through giving rise to conflicting claims of nutritional values and by creating an exaggerated impression of the benefits to be derived from the consumption of such foods.

"If the customary process of manufacturing a staple food refines it so as to remove significant quantities of nutritive factors present in the natural product from which the food is made, and if the refined food is a suitable and efficient carrier of the factors so removed, some nutritionists advocate the restoration of such factors to the levels of the natural product as the most desirable basis of enrichment. To the extent that restoration serves to correct deficiencies of such factors, it is consistent with the promotion of honesty and fair dealing that refined foods be enriched on a restoration basis. However, when the evidence shows that the restoration levels are too low to correct deficiencies, or that deficiencies exist in other factors for which the refined food is an efficient carrier, the promotion of honesty and fair dealing may require the inclusion of corrective quantities of nutritive factors in the enriched food even though such factors are present in smaller quantities or wholly lacking in the natural product from which the food is made. Similar considerations may require the enrichment of unrefined foods."

VISITOR FROM BRAZIL

Dr. Josue de Castro, director of Servico Tecnico da Alimentacao Nacional—technical food service—of Brazil, and professor of nutrition at the University of Brazil, recently visited the United States as guest of the Coordinator of Inter-American Affairs. He came to study food preservation methods, especially dehydration, as Brazil is about to expand its processed food production. In Brazil he combines the functions of Dr. R. M. Wilder and Marvin Jones in WFA. Fernando Pessoa de Queiroz, Brazilian sugar manufacturer, accompanied him.

Subsidy Program In Bad Tangle

Future action on price rollbacks and subsidies uncertain in Washington confusion

NO ONE KNOWS how the President, Food Administrator Marvin Jones, and OPA Boss Prentiss Brown will finally end up in their handling of price rollbacks and food subsidies. If difficulties of calamitous consequence to the public, and to the food industries, were not involved, the whole matter would appear a wild Gilbert and Sullivan extravaganza. Washington has not for many a year seen greater confusion, not even when the synthetic rubber controversy was at its height.

The essential principle of subsidy is that the government should at some stage pay part of the cost of doing business so that the retail price of food may be less without depriving farmers of high prices for the raw materials used. Various methods have been proposed and a few attempted. One technic is that Commodity Credit Corp. should buy raw materials at a high price and resell at a lower one. The loss is made up out of Federal taxes. The food processor getting the raw material is thus able to go ahead and operate under ceiling prices that otherwise would put him in bankruptcy.

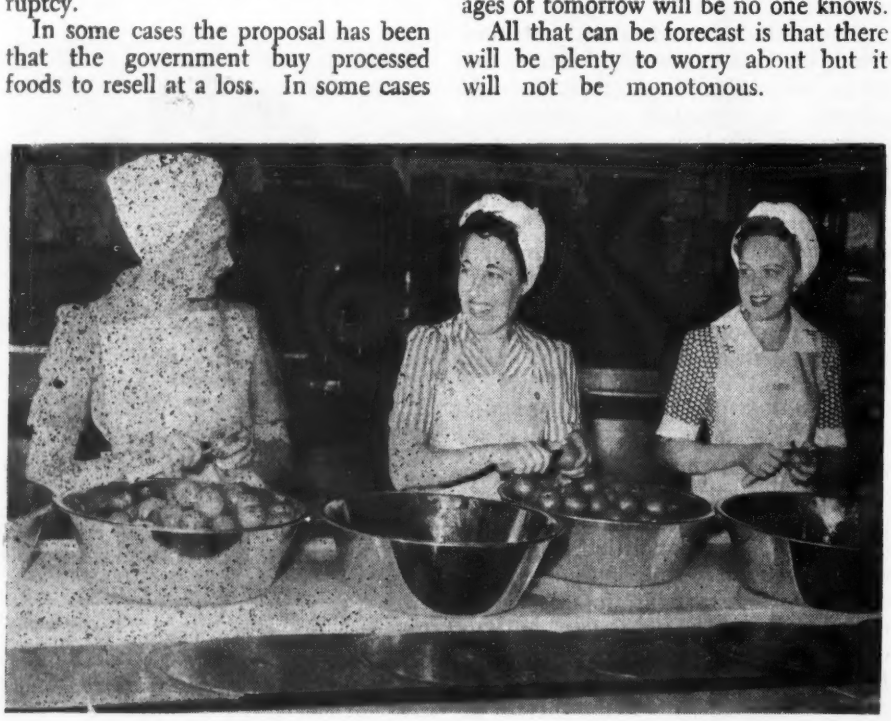
In some cases the proposal has been that the government buy processed foods to resell at a loss. In some cases the proposals amount merely to giving a bonus to merchandisers for doing business so that they may operate at an apparent loss in their market transactions.

All of these procedures have been subject to every variety of criticism and almost every variety of commendation. Economic theories of exactly opposite significance have been forcefully, and sometimes seemingly logically, advocated by different participants in the political bedlam. The only certain thing appears to be the present and prospectively continuing political madhouse with all the inmates of Washington shrieking their pet theories at once.

Shortages Affecting Processors Shifting

SHORTAGES effecting the food processor are shifting. Scarcities of sugar, coffee, cocoa and cork are ending while shortages of cream, tires, gasoline, metal closures and even glass will plague the processor in the immediate future. Ice cream manufacturers were limited at one time by the sugar supply, then by transportation restrictions and at present by shortages of fat. All food manufacturers face an ever changing supply picture. As the shipping situation eases, imports of tropical oils and oils seeds may occur. What the shortages of tomorrow will be no one knows.

All that can be forecast is that there will be plenty to worry about but it will not be monotonous.



THEY'RE SAVING THE CROPS

Faced with an acute shortage of labor for harvesting and processing its food crops, the Ogden, Utah, area developed a program to get volunteers on the job. Civic leaders took on the responsibility of getting members of their organizations to work in their leisure time. American Can Co. placed the resources of its public relations department behind the drive, and the Ogden schools established nurseries to care for workers' children. In less than a fortnight, 3,065 civilians were signed up to work. The crops will be saved. Above are three socialites helping to can tomatoes. They are Mrs. Wesley Tomlinson (left), Mrs. Eugene E. Snyder and Mrs. P. B. Piersanti.

Enriched Flour Standard Issued

Modified requirements were promulgated last month and become effective October 1

MODIFIED requirements for enrichment of flour were promulgated the first week in July and become the requirements for all enriched flour marketed on or after October 1. The new definition as to the quantity of vitamins and minerals required for flour is as follows:

"It contains in each pound not less than 2.0 milligrams and not more than 2.5 milligrams of thiamine, not less than 1.2 milligrams and not more than 1.5 milligrams of riboflavin, not less than 16.0 milligrams and not more than 20.0 milligrams of niacin or niacin amide, not less than 13.0 milligrams and not more than 16.5 milligrams of iron (Fe)."

In the case of enriched self-rising flour it is also required that it contain not less than 500 milligrams and not more than 1,500 milligrams of calcium.

The findings of fact on which this revision in the flour standard is based were published in the Federal Register dated July 3. Copies of that document are available for 10 cents each from Superintendent of Documents, Government Printing Office, Washington, D. C.

Dehydration in Natural Gas Saves Vitamin C

Foods dehydrated in an atmosphere of natural gas retain very nearly all of their original vitamin C content, without adverse effect on color or flavor, according to recent findings. The natural gases used consist chiefly of methane and ethane, and their effect is perhaps due to the fact that they are slightly reducing in their nature.

By this process of dehydration, cabbage prepared in the laboratory had over 600 mg. of vitamin C per 100 grams of dried product. Similar results have been obtained on material prepared in a pilot plant. Potatoes dehydrated in an atmosphere of natural gas had 91 to 122 mg. of vitamin C per 100 grams, as compared with 16 to 30 mg. for air-dehydrated potatoes. Vitamin C losses in foods dehydrated in air may vary from 50 to nearly 100 percent, these losses usually being attributed to the destructive effect on the vitamin of oxygen in the air.

In using the natural-gas atmosphere, dehydraters can be so designed that the gas is recycled, fresh gas being added only to the extent necessary to prevent undesirable accumulation of oxygen

SWIFT RECOGNIZES "SECRET WEAPON"

Swift & Co. recently gave more than 50 employees awards ranging up to almost $1,000 and totaling $4,000 for suggestions to improve the company's wartime food manufacturing and distribution efficiency. And these awards were for suggestions presented in recent weeks and represented only a small portion of total awards so far this year. The picture shows two top prize winners being congratulated by Harold H. Swift, company vice-chairman, at the Suggestion Award ceremonies. Left to right are John Baron and J. C. Varecha, winners, Mr. Swift and W. L. Armstrong, superintendent. Mr. Swift said that the free thinking of employees is "representative of America's most powerful weapon in this total war."

in the system. Engineering studies show that oxygen accumulation can be kept below 0.1 percent by admitting fresh gas to the system at a rate equal to the fuel consumption of the system. Consequently, dehydraters presently operating on natural gas as a fuel could be adapted to the use of natural gas as the drying atmosphere with only a small increase in gas consumption.

A further advantage claimed for the process is that the storage life of gas-dehydrated foods is longer than that of foods dehydrated by other methods because the monomolecular layer of gas absorbed by the foods during drying, and retained during all or part of their storage life, is reducing rather than oxidizing in its effect.

Food storage tests in natural-gas atmospheres are now in progress.

Work on dehydration in a natural-gas atmosphere has been conducted by the laboratories of Godfrey L. Cabot, Inc., Boston and Texas, and by Dr. Francis P. Griffiths, Massachusetts State College, and has been carried through to the pilot-plant stage. Dr. Paul Paveck, National Research Council, has aided in arranging collaborative checking of the vitamin content of samples prepared in the pilot plant.

Congress Takes Action Against Grade Labels

MANDATORY grade labeling or the required use of standards and specifications in the sale of commodities, and including required invoice statements of standards, were prohibited by legislation enacted by Congress prior to its recess on July 8. An exception to this is where the standards in question were previously in general use in industry, or previously lawfully required by statute or by regulation of some government agency other than OPA.

These limitations are contained in an amendment in Section 2 of the Emergency Price Control Act of 1942, as amended.

Export Program Ends

BECAUSE the remaining domestic wheat stocks are needed for food and livestock, the wheat and wheat flour export program operated by the Department of Agriculture since 1938 will not be resumed for the current fiscal year, it was announced by WFA on July 8.

Under the export program, payments were made to exporters to enable them to buy wheat at current domestic prices and to sell wheat and wheat flour in foreign markets in competition with other exporting countries.

Bottlers Cut Mileage

TRUCK MILEAGE was cut more than 48,000,000 miles during the first three months of 1943, as compared with 1941 operations, by the manufacturers of soft drinks. This meant a saving of 5,300,000 gal. of gasoline.

More than 2,500 soft drink trucks were removed from service during the first quarter of 1943, more than 650,000 route trips were eliminated, and average round-trip loads were increased from 77 to 100 percent of truck capacity, according to a report from American Bottlers of Carbonated Beverages.

Pickle Packers Ponder Problems

Low stocks, increased demands, decreased acreage are headaches to Association

FACED with low stocks on hand, increased consumption and decreased 1943 acreage, members of the National Pickle Packers Association met in midsummer conference at Chicago, June 23, to consider an industry program.

June first inventory of salt stock and genuine dills indicated a total of 2,993,842 bu. with an average monthly consumption of 648,665 bu., as compared with a 1942 inventory of 2,835,606 bu. and an average monthly consumption of 589,136 bu.

Disregarding weather conditions, labor conditions and fertilizer supplies which may affect yield-per-acre, the 1943 crop shows promise of being about two-thirds as large as that in 1942. Acreage contracted as of June 15 is only about 77,700 acres as compared with 123,720 acres for 1942.

A resolution was passed to protest rubber-gasket metal-closure restrictions placed by WPB on packers equipped with the tank capacity to process all cucumber stock taken in. The import of the resolution is to obtain the release of these closures for the 1943 pack of overnight dills and cucumber pickles to all packers regardless of their brine tank capacity.

The research committee was encouraged by action taken to set up a fund to broaden association activities by study of ways and means of obtaining increased yield per acre, of improving methods of growing and processing to make the work more pleasant and profitable, and of increasing the nutritive value of pickles.

Protein Is Produced As Alcohol Byproduct

CONCENTRATED PROTEIN is produced as a byproduct of a new process for making alcohol developed by government scientists working at the Park & Tilford distillery at Brownsville, Pa. This byproduct protein is expected to be available in huge quantities for as little as 5 cents a pound. About one billion pounds a year, or enough to supply all the protein needs of 20,000,000 people, if no other source were used, could be produced by the nation's alcohol distilleries now operating exclusively for the government, it is claimed. The recovered protein is in practically pure form, and has virtually the appearance, consistency and food value of the dehydrated egg white.

CONCENTRATING ON CONCENTRATES

Concentrates are not merely a matter of convenience or wartime expediency. Years ago manufacturers realized the amazing utility of Florasynth's concentrated flavoring materials. That throughout the years they have relied on Florasynth Concentrates is "case history" of their effectiveness. That, in days such as these, they can still — for the greater part — depend on their availability and consistency is representative of the ingenuity, research, and resources of Florasynth.

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Food Administration Orders

Tuna Fish—On June 28 WFA announced that the entire production of canned tuna and tuna-like fishes packed after June 27 will be available for U. S. civilian consumers. That part of the canned fish reservation order—FDO 44, which required packers to reserve 60 percent of the 1943 pack of canned tuna, bonito and yellowtail—has been removed.

Grower Prices for Berries—Maximum grower prices for seven types of berries which will go into the 1943 packs for canned and frozen berries were announced on July 5. Maximum prices for these packs have been established by the OPA at levels which reflect increases announced by WFA. The ceiling price will permit processors to pay berry growers prices of 15 cents a pound for red raspberries, 13 cents for black raspberries, 12 cents for youngberries, boysenberries, loganberries and blackberries, and 8 cents for gooseberries.

Spice Quotas—Reduction in the quotas of pepper and cinnamon available to packers, receivers and industrial users for the third quarter of 1943 were ordered June 30. Black and white pepper quotas were reduced to 40 percent of the base period, compared to 60 percent last quarter, and cassia—or cinnamon—to 35 percent, compared to 40. The revisions were made effective in a new order, FDO 19.2, superseding FDO 19.1.

Meat Restriction Order—Meat Restriction Order No. 1—embodying a quota system on the basis of quarter-year periods for slaughterers whose quota bases exceed 2,000,000 lb. per year—which was amended and issued by WFA as FDO 61, effective July 1, established a new designation, "commercial slaughterer." This will be used from now on in reference to slaughterers with such quota bases. At the same time an order was issued by WFA (FDO 61.1) establishing quotas of meat which commercial slaughterers may deliver for civilian consumption during the quota period July 1 to September 30, 1943, inclusive. This order is designed to consolidate the provisions and amendments of the Restriction Order into one order.

Set-Aside Order for Beans, Peas—WFA has announced that government set-aside provisions for designated classes of dry edible beans and dry peas will apply only when beans or peas are delivered into direct channels of consumption. This change, effective July 1, makes it possible for beans and peas to move freely between growers and "country shippers," and between "country shippers." The new set-aside provisions are an amendment to FDO 45, and require reservation for government agencies in an amount equal to not less than 150 percent of the designated classes of dry beans and dry peas delivered into consumer channels.

Grower Prices on Sour Cherries—An increase of $40 per ton in growers' prices of sour cherries for canning and freezing, over prevailing 1942 prices, was announced June 24. The increase is in accordance with the terms of the amended Emergency Price Control Act of 1942. OPA has issued appropriate price ceiling regulations for processed sour cherries, based on these higher grower prices.

Non-Food Use of Figs—FDO 62, effective July 6, prohibits the sale, purchase, or use of certain type figs for alcohol or alcoholic beverages, sirups, flavoring, animal feed, concentrates, scents, or any other byproducts without specific authorization, to keep for food purposes all figs produced in 1943 in the principal production areas of California. The varieties of figs affected by the order are Calimyra, Adriatic and Kadota, either fresh or dried, produced in certain designated counties of California.

Beef for Ships' Operators—Because ships' operators have been unable to purchase supplies of beef to meet their urgent requirements for crews of ocean-going vessels, the beef set aside under FDO 28.2 will be available for use of the War Shipping Administration and for ships' operators who purchase meat under supervision of the WSA, effective June 29, 1943. This ruling is contained in FDO 28.2, Amendment 1.

Beef, Veal, Pork, Lamb and Mutton—Civilian quotas for beef, veal, pork, lamb and mutton for the next 3 months were announced June 29. Beef and veal percentages remain the same as in the quota ending June 30, but percentages for pork, lamb and mutton were raised. The changes in percentages are not expected to mean any material change in the total quantity of meat available to civilians from commercial slaughter.

Fish Oil Reserved—WFA has set up a purchase program under which it will obtain for war needs regular supplies of fish oils pressed from the 1943 catch of California sardines, Oregon and Washington pilchard, menhaden and Alaska herring. FDO 59, effective July 1, required producers of these oils to set aside for purchase by the Food Distribution Administration the 2nd, 6th, and every 6th tank car thereafter from the new production.

Storage of Shell Eggs—To keep an active file of persons owning or operating refrigerated storage space in which shell eggs are stored, WFA on July 3 issued amendment 1 to FDO 40. Each person owning or operating refrigerated storage space totaling 7,500 cu. ft. or more in a single structure, in which shell eggs were stored on July 1, was required to file a notice of each structure with the War Food Administration.

Zante Currant Grapes—A further revision of FDO 17 issued on June 29 limited the delivery of Zante currant grapes. No producer may now sell or deliver raisin variety grapes or Zante currant grapes produced in 1943, except to the Food Distribution Administration. No producer may, unless specifically authorized by the Director, use more than 100 lb. of raisin variety grapes or Zante currant grapes for any purpose other than conversion into raisins.

Macaroni Plays Wartime Role

Its increased importance as food reviewed at convention of manufacturers

EVALUATION of macaroni products as wartime foods dominated the 40th annual meeting of the National Macaroni Manufacturers Association, June 25-26, at Chicago.

Speaking for the armed forces, Col. John N. Gage, executive officer, Chicago Quartermaster Depot, cited macaroni products as alternates for scarce energy foods such as potatoes, and as a variety dish. Only sound semolina No. 1 quality is bought. For the first quarter of 1943, Army purchases have been: 6,000,000 lb. of macaroni, 4,000,000 lb. of spaghetti and 2,000,000 lb. of noodles. For overseas shipment, only elbow macaroni and long spaghetti are specified, packed 15 and 20 lb., respectively, in special waterproofed packages.

V. L. Bushman, spokesman for the Food Distribution Administration, indicated the rôle that macaroni products will play in the expanding food program based on greater use of cereals. He cited the 1939 production of 684,000,000 lb., the 1942 production of approximately 900,000,000 lb. and the estimated 1943 production of 1,100,000,000 lb., with no increase in the number of plants, as evidence that efficiency in manufacture, with removal of bottlenecks in the drying operation, is as important and more feasible than the building of new plants. He also acknowledged the carrying on of experiments to incorporate soya flour, wheat germ, gluten and other nutrients into macaroni, but indicated that their presence would not be required for the present.

Donald S. Payne, chief of the Soya Products Section, Grain Products Branch, Food Distribution Administration, outlined the FDA program to encourage the addition of 5 to 15 percent soya flour to a group of foods including bread and macaroni products. Disclosure was made that tentative FDA standards for wheat-soya products indicate a 15 percent content for macaroni. He stated that approximately 200,000,000 lb. of high-quality soya flour will be available for domestic use during the last half of 1943, with about 500,000,000 lb. for 1944 and about 1,000,000,000 lb. for Lend-Lease and reoccupied territories. Louis S. Viviano, Faust Macaroni Co., St. Louis, reported results of tests made by his company using 10, 12½, 15 and 17½ percent sova flour in macaroni. Consumer tests show a 10 percent content to be the preferred level.

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High speed, quick adjustability for various sizes, and the fact that they can do a perfect job with practically any wrapping material, has made our wrapping machines the most widely used—in war and in peace. Carbine clips are the most recent addition to the large variety of products now being wrapped by these machines.

Operating at a speed of 75 per minute, our model FA wraps each clip in a special material selected for its strength and moisture-resisting properties. You'll notice that this material has a crinkled surface and that the clip has a rounded side and an uneven surface at one end. Yet in spite of these difficulties, the FA makes an extremely tight and firmly heat-sealed wrap. This is but one of over 70 models of our wrapping machines in the service of American manufacturers.

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With respect to mineral enrichment of macaroni products, Director of Research B. R. Jacobs recommended a higher level than is approved for white flour. Recommendation was also made that studies be started to work out details of cooking procedure which will give increased retention of water-soluble vitamins and minerals in the cooked dish.

Officers Reelected

All officers were reelected: president—C. W. Wolfe, Megs Macaroni Co., Harrisburg, Pa.; vice-president—A. Irving Grass, I. J. Grass Noodle Co., Chicago; secretary-treasurer—M. J. Donna, Braidwood, Ill.; director of research—Benj. R. Jacobs, Washington, D. C.; adviser—Jos. J. Cuneo, La Premiata Macaroni Corp., Connellsville, Pa.

Ice Cream Is "Essential"

ICE CREAM manufacturing is an essential activity in the eyes of the War Manpower Commission, according to a statement recently made by Paul V. McNutt. This means that the industry will receive consideration by draft boards in respect to deferment of essential employees, and it also means that workers in the industry are affected by the "job freeze" order.

Enrichment of Flour Debated at Conference

ENRICHMENT of all bread is desired by the government to support the best practical nutrition program. Commercially baked bread must contain vitamins and minerals under Food Distribution orders; but home baked bread will not be of the enriched type unless all household flour contains the requisite ingredients. War Food Administration, seeking to correct this, called a conference for July 21 in Washington.

Two opposing points of view were planned, one favoring and the other opposing a requirement that all flour sold be of the enriched type. The baking industry has objected to this idea, since it wishes a freedom of choice among raw materials. Many bakers feel that they can make as good or better bread, with full enrichment, without using enriched flour. But the nutritionists and some of the flour millers feel that home-baked bread is most certainly going to be fully enriched if only enriched flour is available. On the other hand, it appears that some bakers, and even some flour millers, would prefer to have general distribution of unenriched flour permissible for commercial reasons, among others.

Regardless of the conclusions reached by WFA, it is necessary that whenever flour is enriched it meet the new and higher enrichment requirements by October 1, when a new Food and Drug identity standard takes effect.

WPB Orders

Rotenone—Although the War Food Administration now regulates the use of rotenone insecticides, WPB still continues to make allocations of the unprocessed rotenone to manufacturers. Amendment 1 to M-133, issued July 6, restricts the manufacture or processing of any rotenone insecticide in the form of dust or powder with a content of more than half of one percent of rotenone, unless specifically authorized. No rotenone containing pyrethrum may be manufactured. Further limitations are placed on delivery of the product.

Theobromine and Caffeine—Further restrictions on the use of theobromine and caffeine were issued on July 6 in an amendment to M-222. No person shall deliver theobromine or caffeine to any person except as specifically authorized by WPB. No supplier may now deliver in any calendar month beginning with August, 1943, to any person more than 2 lb. of theobromine or 2 lb. of caffeine unless the person has a certificate to the effect that he is entitled to receive more.

Home Dehydraters—Regulations governing the production of 100,000 domestic food dehydraters in self-contained units were announced on July 9 in L-308. The order includes a schedule of 31 manufacturers who will participate in the program to produce the food-preserving units. The manufacture of all units permitted under the quotas must be completed before September 1. To insure the flow of the dehydraters to those who can make the best use of them, WFA and the Consumers Durable Goods Division of WPB are collaborating on the method of distribution.

Container Quotas—A new amendment to L-103, effective July 1, placed a four-month quota on the number of new glass containers which a user may accept, have manufactured or have set aside for his account for packing several classes of specified products. Beer and soft drinks are affected by the new quotas. The quota for each class of product is a percentage of base quantity, subject to certain adjustments. Users may choose between the four-month period, July 1, 1942, to October 31, 1942, and the full year 1942 as a base period.

Refrigerants—Delivery of chlorinated hydrocarbon refrigerant (Freon) to those who use it in refrigerating equipment for dispensing and storing carbonated or malt beverages was prohibited by an amendment to M-28, issued July 12. The order establishes more rigid controls over the use of chlorinated hydrocarbon refrigerants, setting up eight classes of users.

Folding and Set-up Boxes—The demands of war having created a further shortage in

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JAMISON-BUILT COLD STORAGE DOORS

paperboard containers, WPB on June 22 issued an amendment to L-239 restricting manufacture. No person may now manufacture any box for seasonal or other special purpose having a greater pulp content or area or weight of paper or paperboard than contained in the usual commercial box for like contents. Any sleeves or extra containers for seasonal or other special purposes unless also required for the usual commercial box for like contents are prohibited.

Citric Acid—No person shall accept delivery from all suppliers of more than 5,000 lb. of citric acid in the aggregate during July, 1943, or during any calendar month thereafter, except as specifically authorized by WPB. On and after July 1, 1943, according to an amendment to M-321 issued June 30, no supplier shall use citric acid for any purpose except as specifically authorized by WPB upon application.

Wooden Shipping Containers—Defense requirements have created shortages in shipping containers, making necessary an amendment to L-232, issued June 17. No person shall manufacture commercially or assemble any wooden shipping container which does not conform with the specifications of Schedule A of the order. No person may manufacture commercially any wooden parts designed for any wooden shipping container which, when assembled, will not conform with the terms of the order.

HELPS FEED HER BOYS

P. J. Ritter Co., Bridgeton, N. J., saw the labor shortage coming and did something about it. They sold people in their community the idea that it's a good idea to work at Ritter's. Practically every means of advertising was used—from the radio to door-to-door calls and including full-page newspaper ads. They got the workers, among them a mother with seven sons in the armed forces, Mrs. Daisy Charlton, shown above, who works to "help feed her boys." To keep the workers contented, and help their efficiency, Ritters shows them movies of battle scenes and films on safety, absenteeism and buying war bonds, as well as straight entertainment pictures.

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Jones Announces 1944 Crop Goals

Acreage goals follow program set up by Davis; high increase in wheat, peanuts, soybeans

PROCLAIMING that "Every crop acre and every farming facility in the Nation should be mobilized for its utmost productive use," War Food Administrator Marvin Jones last month announced the 1944 agricultural program.

While specific acreage goals for all crops had not been determined by the new administrator, the recommendations for wheat, rye and a few other crops indicated that the program that Chester Davis had worked out would be followed closely.

Indicated increases in the 1944 acreage goals are 26 percent for wheat, 30 to 40 percent for dry edible beans and peas, 20 to 25 percent for peanuts and 15 to 20 percent for soybeans used as beans. If the program as closely parallels that of Chester Davis through the rest of the acreage goals, there will be a sharp reduction in the sugar beet acreage, reflecting a shortage of farm labor and the acknowledgment that no more labor can be made available.

Vegetables for commercial processing will be increased possibly as much as 20 percent next year over this year.

Efforts will be made to maintain dairy herds and milk production, but whether the pressure to reduce the number of hogs on the farms will be carried over from the Davis into the Jones regime is problematical. The indications are that the efforts will continue. A reduction in the livestock population will make more feed available for increased egg and dressed poultry production as well as the maintenance of milk production. WFA will continue its program of support prices and the agricultural conservation program for which Congress has authorized the use of $300,000,000 in 1944.

Molasses Shortage Threatens Acids, Yeast

DRASTIC measures were attempted to correct the threatened shortage of lactic acid, citric acid, yeast and yeast products which seemed likely to result from the molasses shortage. But the first correction attempted caused more trouble than it cured An entirely new start proved necessary during June, and full adjustment is not likely until fall.

The primary purpose of the new plan is to get molasses as a fermentation raw material. But merely taking beet molasses from Midwest and far-West establishments proved a dangerous "cure." It threatened to cut off production of over 100,000 tons of refined beet sugar. And a complete upset of balance in beet sugar plants develops if the molasses is not left available for processing in the Steffens house.

Transfer of some manufacturing operations to Cuba and Puerto Rico is one remedy being considered. Other fermentable raw materials are being sought.

An indirect development in prospect is the utilization of waste molasses in Cuba and Puerto Rico, not only for food materials but also to make dry yeast.

BOOSTING MORALE WITH DOUGHNUTS

Two Red Cross workers preparing an American favorite, doughnuts, for soldiers in North Africa, using Clubmobiles equipped with a doughnut machine and a coffee urn. A doughboy in an advanced flying base expressed the soldiers' appreciation of this service in these words: "I didn't know the foxhole was so close to heaven."

More Authority Seen for WFA

Appointment of Porter may mean transfer of food pricing and rationing powers

APPOINTMENT of Paul Porter's OPA rent chief and avowed low price man as Deputy WFA Administrator, is considered by many to presage the transfer of food pricing and rationing from OPA to WFA. This does not mean that the bills now in committee that would have dismembered OPA will be passed. This legislation was introduced on the assumption that the food program would be in the hands of Chester Davis.

But Davis is out. Chances are good that the Administration will arrange for food rationing and pricing problems to be settled in the office of the War Food Administrator and that OPA will degenerate until it merely handles the mechanics of the plans worked out elsewhere.

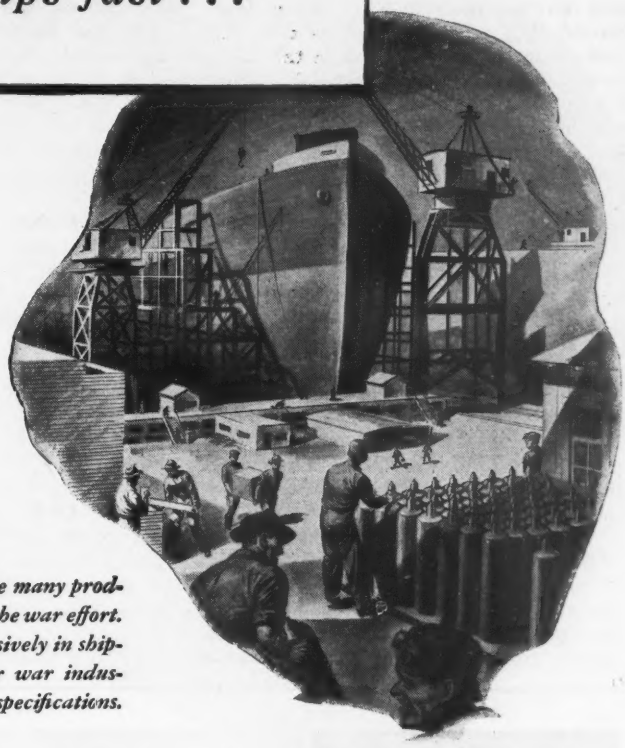
Establishment of a Food Price Branch within the War Food Administration has been described officially as a move to bring about closer cooperation between the food pricing activities of OPA and the food distribution programs of WFA. It is significant that A. C. Hoffman, the former codirector of OPA's Food Pricing Division, is in charge where he reports to S. R. Smith, Deputy War Food Distribution Director for Civilian Activities. In Washington it is believed that the shift of pricing authority from OPA to WFA will follow shortly.

Additional Fats Made Available to Users

WITH HOUSEHOLD waste fat collections still running less than 50 percent of the goal, it has been necessary to provide other sources of grease for industrial users.

Crude soybean oil has been made available to the soap manufacturers and fat splitters for the production of glycerine through a modification of FDO 42 and in accordance with provisions of FDO 33. Some lard is also finding its way into the soap kettles. This is material that has backed up in the hands of some of the smaller packers and turned rancid before it could be disposed of as an edible product. The sale of this lard to the soapers is helping both the buyer and seller, one having no raw material and the other no market. Transactions are being made under the hardship clause of FDO 42 with the possible easing of the glycerine situation being advanced as an additional argument.

It takes a lot of cylinders to build ships fast . . .



Shown below is one of the many products built by Hackney for the war effort. This cylinder, used extensively in shipbuilding and many other war industries, is cold-drawn to specifications.

To build a bridge of boats across the submarine-infested Atlantic—calls for shipbuilding of mammoth proportions. Acetylene welding and cutting are playing a vital role in helping American shipbuilders meet the Axis' challenge. The performance records of Hackney Acetylene Cylinder shells in the field, have proved their reliability.

Hackney Drums and Barrels

Products like the one described above keep rolling out of Pressed Steel Tank Company's factory. Today, all of Hackney's facilities are pledged to the making of products for Victory. Hackney drums and barrels are now in service for hundreds of war plants —helping to solve transportation and storage problems for vital foods. Thus, they are hastening the day when their advantages can be available to all businesses.

When that day arrives, the vast knowledge and research of Hackney's wartime experiences will be available to all industry. It is your assurance that Hackney will continue to make improved containers for gases, liquids and solids.

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CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

CAPITAL VIEWS

TEEN-AGE WORKERS—Many food plants are using youngsters on jobs not before entrusted to youth. Two new precautions are necessary. First, it is essential to be sure that the youngsters are not working in violation of State or Federal laws which protect those of tender years. Second, it is necessary to afford somewhat closer supervision. One means to this end is to mix in a few elderly workers to stabilize a group. Even though the older persons may not be any more efficient, perhaps less efficient, they prevent the excessive enthusiasm of youth from running away, a factor which sometimes brings disastrous results.

PRICE COMPETITION—The OPA has found that higher ceiling prices must be permitted on skim milk to induce farmers to sell it for casein manufacture. This is merely another evidence that the New Dealers in the end have to recognize the law of supply and demand which they commonly ignore, and even claim to have repealed. The fact is that it is just as difficult to repeal that economic law as it is to repeal the law of gravity.

"ESSENTIAL"—The degree of essentiality of various industries is defined in order that those industries of greatest public value may get preferential treatment in gasoline supply, especially in the scarcity areas of the Eastern Seaboard States. It is particularly noticeable that almost all food manufacture and distribution is at the top of the list. This fact also justifies a similar claim with respect to labor which is really needed to maintain plant operation. Management not only may, but should, argue with local draft boards vigorously to retain key workers. Such men are of more value to the public on their present jobs at home than they would be in uniform. It is not patriotic to consent too easily to breaking up first-class food manufacturing organizations to meet Selective Service demands.

SOCIALIZING INFLUENCE—Some small industries are being given special loans by RFC to offset lost earning power during wartime. The primary purpose is to keep these small enterprises from going into receivership, a commendable objective. But a secondary effect may be governmental ownership of far too many concerns. Those having influence locally regarding such loans should seek to avoid that socializing influence.

"TOO OLD"—The government reports that more than a third of the persons newly employed during May were 45 years of age or older. It compliments these workers for experience and steadiness; and it commends employers who are losing their prejudice against the older employee group. Older women, as well as older men, are recommended, a fact that must be taken into account in many food processing industries which have no other untapped pool from which to draw new workers.

COAL STORAGE—Many food establishlishments must stock up on coal before winter. This is an essential precaution against shortages when the cold weather and continued rise in war transportation may reduce promptness of fuel delivery. But care must be taken to build the coal pile properly to avoid heating and spontaneous combustion. Even where the coal pile does not take fire, there is often deterioration in coal quality during storage which can readily be avoided by proper planning. If the local dealers cannot give adequate advice, the U. S. Bureau of Mines at Washington should be consulted.

ALCOHOL VERSUS FOOD—Grain can be used for feed or for food or for alcohol manufacture. The last usage has become vital because of the huge consumption of alcohol for synthetic rubber making. Those interested in processing wheat are going to find that the alcohol plants are among their major competitors for the grain which comes to market. They should plan accordingly as scarcity looms in any areas for any particular grade or type of grain.

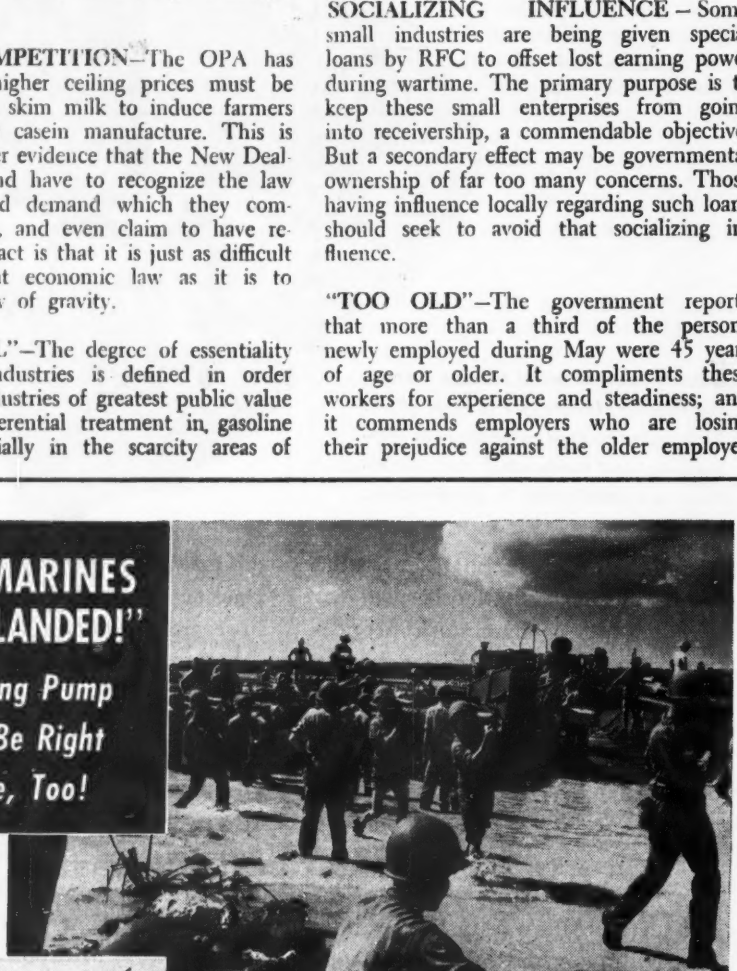
LABOR IN POSTWAR—Already labor leaders are developing a postwar program. They know what they want and are out to get it. This means that industrial management must be comparably aware of the problems and ready to offer effective solutions. Among other things, food managements are going to be again confronted with the question of organizing under a 30-hour week. And of course labor organizations are going to want the same weekly pay as they have been getting for longer periods of labor. If there is any time to spare from running the plant, it will not be a bad idea to figure out what amendments in management policy must be made under these circumstances when they come to bear directly on daily decisions.

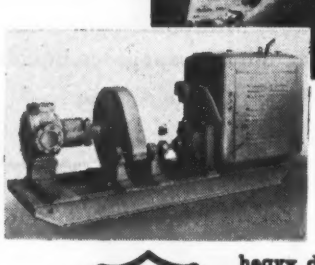
FORCED IMPROVEMENT—The baking industry has been forced to make many changes in its use of shortening and of fats and oils for other purposes. Very definite economy in fat for pan greasing has been made possible. Such changes have come through necessity but may very well persist after the war as permanent advances in the baking art. Let's hope so.

CONGRESS IN RECESS—While Congressmen are at home this summer there will be opportunity for direct conferences between industry spokesmen and the legislators. Definite constructive comments are welcomed by both Senators and Representatives. They should have explained to them both the difficulties with restrictive legislation and the need for certain new authority or new policy. They can then act intelligently in the interest of their constituency when they come back to active service in the Fall. Industrial executives should not fail to take advantage of every opportunity for such conference regardless of the political faction or party to which they or their representatives belong.

"The MARINES HAVE LANDED!"

A Viking Pump May Be Right There, Too!





Fuel oil for mechanized equipment and for Diesel generated Electricity must be immediately available to insure the success of operations after the U. S. Marines have landed.

The Viking portable fuel transfer unit, pictured here, is used for delivering vital petroleum products at beachheads and temporary bases. The unit is complete with heavy duty Viking Rotary Pump, back-geared to an engine with individual clutch, all mounted on a rugged, portable steel base.

Because Viking is engaged in important War-time construction for the U. S. marine Corps, many valued civilian customers find it impossible to get Viking Rotary Pumps at all, or to get them only after considerable delay. Thanks for your patriotism and your patience. We all should consider it a privilege to help our fighting Marines batter Togo, Adolph and Benito into oblivion.

VIKING PUMPS — FIRST IN AMERICA

VIKING Pump COMPANY
CEDAR FALLS, IOWA

Malt Economy Seen in New Alcohol Process

LARGE ECONOMY in dollars and in malt may result from a new method being tested commercially for making industrial alcohol from wheat at beverage and industrial alcohol plants. This new method was discovered by A. K. Balls and Irwin W. Tucker of the Bureau of Agricultural and Industrial Chemistry just before the transfer of the enzyme laboratory from Washington to California. It consists in treating granular wheat flour with a very dilute solution of sodium sulphite as the first step in processing. The contained gluten is released and the enzymes activated. Removal of the coagulated gluten as a scum leaves a suspension and solution of starch and sugar. The conversion of the starch to sugar, making it available for fermentation, continues very effectively.

Commercial trials of the new process are being made at several industrial establishments. Technical difficulties are being ironed out; and it is hoped that commercial application in all of the plants making alcohol from wheat may begin in the very near future.

Preliminary results indicate three major advantages. The recovery of gluten is easy and practically complete without handling of thin slops. The requirement for malt is reduced or perhaps completely eliminated. And the yields of alcohol are apparently maintained at nearly the same level per hundred pounds of granular wheat flour used despite the fact that malt is not present in its customary quantity. Certainly the quantity of granular flour required to supplant the malt saved will be much less than pound for pound, according to preliminary trials.

Correction

A PHOTOGRAPH on page 62 of the July issue of FOOD INDUSTRIES showed B. E. Proctor, MIT, and Joseph Blumlein, dehydration field superintendent of the Q.M.C., at the meeting of the Institute of Food Technologists. Unfortunately, the caption under the picture identified the man with Mr. Proctor as Mr. Goss instead of Mr. Blumlein.— THE EDITORS.

SCHEDULE OF EVENTS

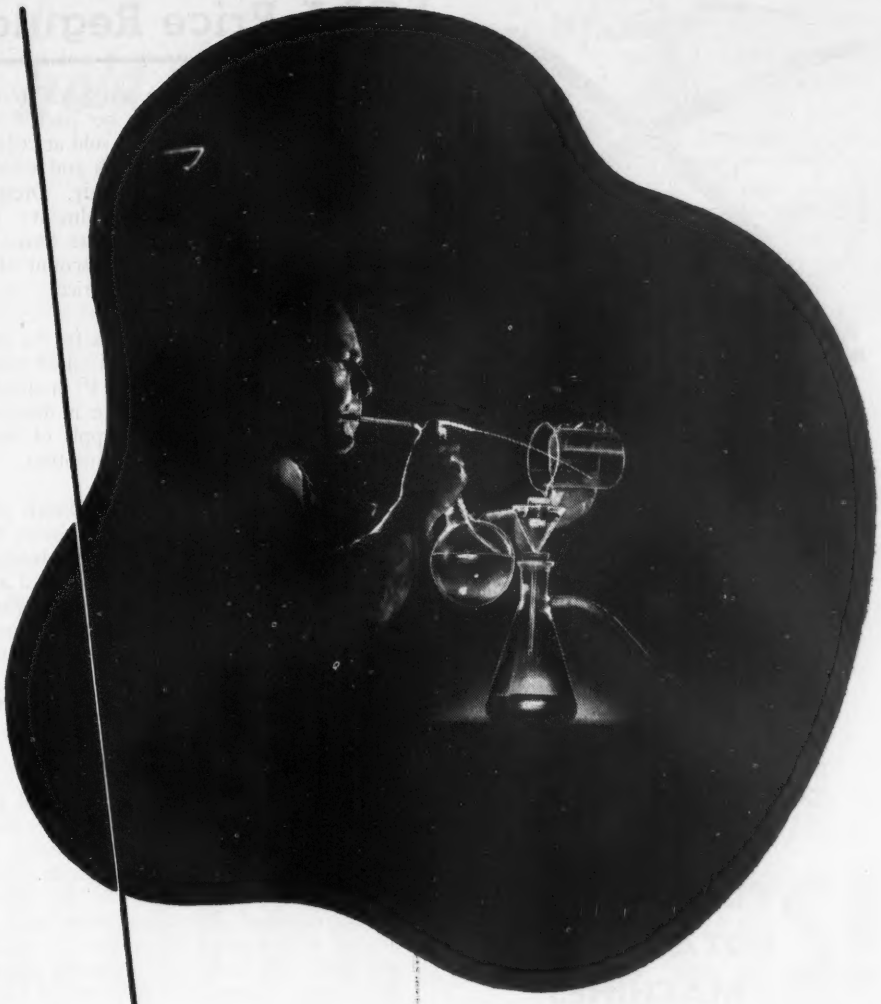
AUGUST

3– 5—International Apple Association, 48th annual meeting, Hotel Sherman, Chicago, Ill.

18–21—Special Rationing Conference, National Association of Food Distributors, annual convention, Hotel Sherman, Chicago, Ill.

SEPTEMBER

6–10—Agricultural & Food Division, American Chemical Society, Pittsburgh, Pa.



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In few products are the purity and uniformity of every ingredient as important as in yours . . . particularly the purity and uniformity of the flavors you use.

Yet the human element enters even into the production of fine food flavors—one of the closest, most scientifically controlled operations in all industry.

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Methyl Salicylate Monsanto
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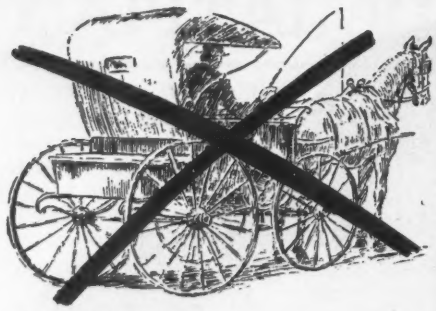
SERVING INDUSTRY . . . WHICH SERVES MANKIND



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OPA Price Regulations

Poultry—All dressed, drawn and quick frozen eviscerated poultry has to be packed in boxes or barrels in order to be sold at ceiling prices established for processors and wholesalers, OPA announced recently. Dressed poultry, according to amendment 10, RMPR 269, that is sold in loose form, or not boxed, is to be sold at a discount of 1 cent per pound below ceiling prices.

Egg Products—Maximum prices for 45 percent yolks, and for sugared and salted yolks, were increased slightly on June 30 in amendment 9, MPR 333. The move is designed to provide a more adequate supply of these egg products for civilian consumption.

Dressed Hogs—The OPA order which provided that, in figuring maximum prices, the 3 percent transportation levy in the Internal Revenue Act of 1942 should be treated as a 3 percent increase in transportation costs, was made applicable on July 9 to the regulation covering dressed hogs and wholesale pork cuts. The action, amendment 3 to Supplementary Order 31, will not affect the cost of living. The added costs will be absorbed by the packers.

Fountain Fruits—Fountain fruits, used primarily as ice cream topping and in the manufacture of ice cream, were removed on July 8 from the list of rationed foods. These products consist of whole, cut or crushed fruits, combined with sugar solids equal to at least 40 percent of the product by weight, and with color, flavoring acidulant or preservative added. Amendment 46 to Ration Order 6A, effective July 14, also provided that certain persons who become "industrial users" of processed foods under Ration Order 13 will receive an allotment of ration points for that portion of any allotment period during which they operate as industrial users.

Canned Salmon—Amendment 2 to MPR 265, effective July 13, established dollars-and-cents ceilings at the canning level for five additional types of canned salmon, and the price of another type has been rolled back $2.20 per case. Included in the order are Alaska king, Alaska chinook, coho, pink and Puget Sound sockeye salmon, and rolled back from $12.00 to $10.00 per case is the price for ½-lb. flats of Alaska chinook.

Dehydrated Fruits—OPA on July 3 announced that inventory adjustments will be made in the case of institutional users having ration points tied up in dry and dehydrated fruits which on March 29 were removed from rationing and are not now rationed. Authority to make such adjustments is vested in the local War Price and Rationing Boards subject to certain restrictions.

Sun Dried Shrimp—Cents-per-pound maximum prices for sun-dried shrimp were established by OPA in MPR 419, effective July 10. The maximum prices—35 cents a pound on the platform and 42 cents per pound packaged—represent a roll-back from the inflated level to which prices have risen this year.

Miscellaneous Foods—Manufacturers of six miscellaneous foods were granted increases in maximum prices on July 2 to offset increased costs of raw materials already in effect at other levels. Items affected by MPR 262 are peanut butter sandwiches and peanut candy, macaroni and spaghetti dinners and chow mein noodles, dietetic health foods and rice farina cereal.

Fruit Preserves—A simplified procedure for determining maximum prices for fruit preserves, jams and jellies was provided packers on July 2. Before this, on new items which could not readily be priced by packers under the formula provided in MPR 226 and for which competitive prices did not exist, special application had to be made to OPA for a specific ceiling level, resulting in delay. Amendment 7 to the regulation gives packers the option of establishing their own maximum prices on these new items, using the formula which OPA would employ, and submitting the maximum prices to OPA for approval within 10 days.

Meat Discounts—Quantity discounts by meat packers of 75 cents per 100 lb. on carloads of beef and veal carcasses sold to all buyers, including war procurement agencies, and of 50 cents per hundredweight on less-than-carloads sold to wholesalers were reinstated on June 25 in amendment 18 to MPR 169. The new amendment removes the generalized quantity discounts established in a previous amendment to the original order.

Beans, Macaroni, Noodles—Formulas by which manufacturers of processed beans, macaroni products and noodle products shall establish their maximum prices under present-day circumstances were announced on July 14. The formulas take into account increased raw material costs and will mean an increase in prices. Since the commodities are sold under fixed mark-up at retail, there will be an increase in the price to the ultimate consumer.

Canned Vegetables—OPA on July 5 completed its pricing of the 1943 pack of canned vegetables, establishing specific dollars-and-cents maximum prices for three commodities and setting up formulas to price a miscellaneous group. All prices are at the canner level. The three vegetables for which specific prices are established are asparagus, mustard greens and turnip greens. The action also revises in considerable detail the prices set earlier for corn, tomatoes, snap beans and peas. Amendment 9 to MPR 306, released July 5, revises spinach ceilings to allow an additional 4½ percent in 14 states for wage increases approved by OES.

Grades of Eggs—An additional 1 cent a dozen above the established maximums for consumer grades AA and A eggs can be charged by persons selling to the United States government when eggs of these grades are treated before the sale with mineral oil for preservative purposes, OPA announced on July 15, in amendment 5 to MPR 333.

Appointment of Jones Came As No Surprise

ABRUPT ANNOUNCEMENT from the White House that Judge Marvin Jones was to assume the duties of Food Administrator, together with the letter of resignation from Chester Davis and the President's acceptance, was not a complete surprise, except possibly to some of the members of Congress. News commentators had forecast the possibility on the grounds that the power to properly handle the task had not been delegated and self protection would force Mr. Davis to leave the post.

Marvin Jones was appointed Food Administrator in a move which many Washington observers interpreted as a direct slap at Congress. The appointment more likely was made because Mr. Jones would take orders.

Chester Davis openly opposed subsidies. He had the confidence of Congress, the farmers and food processors. His successor definitely is unpopular on Capitol Hill as the standard bearer for the President's subsidy program.

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The French and Arabs in North Africa who receive the tea shipped in these containers under Lend-Lease will know that it comes from Uncle Sam. The Flag and the Statue of Liberty mean America in any language. And for those who stop to read, these messages are printed on alternate panels in French and Arabic: "Tea Coming From the U. S. A." and "The Statue of Liberty in the Port of New York—Symbol of Friendship." General Foods Corp., New York, packs the tea for the government. The box is made by Robert Gair Co., Inc.

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Corn Shortage Remains Serious

Many food processors face a lack of raw material unless the situation improves

ABOUT 200 million bushels of corn per year must be available for the dry millers and for the wet grinders, or the corn products used for food will not be available for important users. Farmers have been loathe to sell corn lately because it was worth more as pig feed than they could get under the price ceilings prevailing. Shutdown of corn milling plants was inevitable.

Many food processors are very directly concerned with this situation. The wet grinders of corn make about one-sixth of the food sweeteners used in the United States. They make an even larger percentage of the sweeteners used in the manufacture of bread, crackers, ice cream, confectionery and a multitude of other manufactured foods. Shortage of corn sirup or corn sugar or dextrose approaches disaster for a large percentage of all food establishments.

Washington has been in a bitter controversy as to the right remedy for the corn shortage. Higher prices for corn, rules compelling marketing, lower prices for hogs (to reduce corn use on the farm), and a score of other proposals have been made. Inability of the President and Chester Davis to agree on this issue, among others, was the cause of Davis' resignation and the President's unfriendly attitude and published reply.

At mid-July it was not clear how—not even whether—the Administration was going to solve the question of getting enough corn to make needed corn sweeteners and cornstarch. Meantime, OPA went so far as to authorize special cane sugar and beet sugar allowances to supplement normal quotas for firms that customarily use substantial amounts of the corn sweeteners.

Dehydration Plants To Be Built in Cuba

THREE vegetable dehydration plants with a capacity of 20,000 tons annually will be constructed in Cuba by American Dehydrating Co. of Cuba. The production, it is reported, is to be supplied to the United States during the next two years. The type of dehydraters employed will be the center-exhaust type similar to the installation in the Beech-Nut dehydration plant.

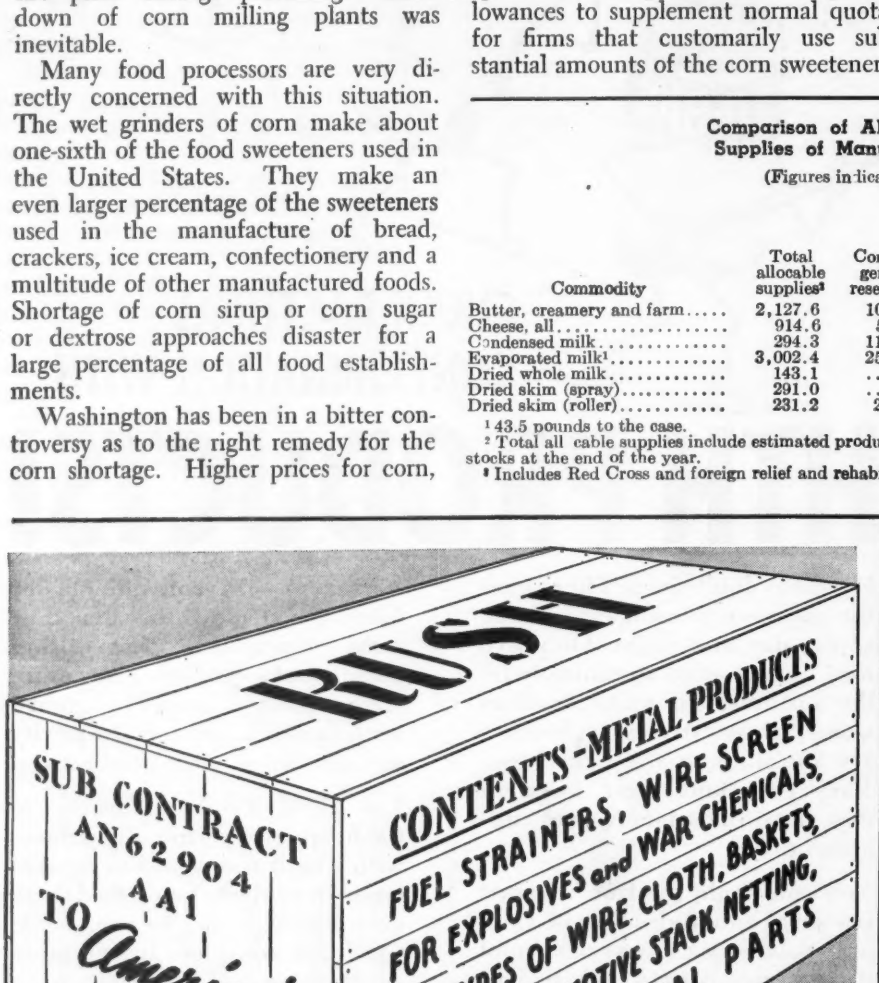
The Cuban dehydrating plants will start operating on sweet potatoes and beets and later will branch out to other products.

Comparison of Allocations and Allocable Supplies of Manufactured Milk Products

(Figures indicate millions of pounds)

Commodity	Total allocable supplies[2]	Allocation July 1, 1943, to June 30, 1944: Contingency reserves	Military and war services	Lend-Lease	Other exports and shipments[3]	U. S. Domestic
Butter, creamery and farm	2,127.6	10.0	316.0	123.2	8.3	1,670.1
Cheese, all	914.6	5.0	[1]101.4	169.7	130.4	508.1
Condensed milk	294.3	11.5	.....	41.8	29.0	212.0
Evaporated milk[1]	3,002.4	25.0	1,056.0	342.8	273.6	1,305.0
Dried whole milk	143.1	....	[1]59.4	38.1	25.5	20.0
Dried skim (spray)	291.0	....	46.2	135.8	19.0	90.0
Dried skim (roller)	231.2	2.0	[1]15.8	38.4	90.0	85.0

[1] 43.5 pounds to the case.
[2] Total all cable supplies include estimated production plus stocks at the beginning of the year less required stocks at the end of the year.
[3] Includes Red Cross and foreign relief and rehabilitation.



Milk Supply Allocated

For the year from July 1, 1943, to June 30, 1944, the prospective U. S. output of manufactured milk products has been allocated to various uses by the War Food Administration. This allocation puts further restrictions on domestic consumption—either direct or indirect—of these products and hence will affect the demand for competitive protein and fat foods. The allocation is given in the table above.

Crop Prospects Up

In spite of the late spring and the excessive rains in many growing regions, crop prospects improved considerably between the June and July reports of the Crop Reporting Board. Taken as a whole, it is evident that total 1943 production will not be as great as in 1942. But the gap has been closed somewhat, and certain wanted products will be even more abundant than last year.

Wheat production, put at 790,823,000 bu. in the July report, against 730,524,000 bu. in the June report, compares to 981,327,000 bu. in 1942 and to a 1932-1941 average of 738,412,000 bu. The prospective 1943 crop is well above domestic requirements.

Oats, estimated at 1,168,850,000 bu. in June, were raised to 1,242,255,000 bu. in the July report. This compares

to an oat crop of 1,358,730,000 bu. in 1942, and is well above the 1932-1941 average of 1,018,783,000 bu. Most of the other grain crops, while smaller than in 1942, are estimated to be greater than the 1938-1941 averages.

Considerable increases over 1942 output are expected in the dry bean and pea crops, with beans estimated at 22,021,000 bags this year compared to 19,608,000 bags in 1942 and a 1932-1941 average of 14,325,000 bags; and peas set at 9,689,000 bags compared to 7,160,000 bags last year and a 1932-1941 average of 2,617,000 bags.

Other increases are expected, with peanuts up 14 percent over 1942; soybeans, up 8.5 percent over 1942; and potatoes, up 24 percent over 1942. In contrast, cotton is estimated to be 5.6 percent below 1942, indicating a smaller yield of cottonseed oil.

Fruit production is still expected to be below 1942 output. The July report set the combined production of peaches, pears, grapes, cherries, plums, prunes and apricots at 12 percent below the 1942 yield.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded July (thousands)	Total Awarded 1943 (thousands)
Bakery	$400	.....	.....
Beverages	.....	.....	.....
Canning and Preserving	220	.....	$115
Cold Storage	440	$190	345
Confectionery	.....	.....	40
Grain Mill Products	90	.....	1,797
Ice Manufactured	.....	.....	40
Meats and Meat-Products	60	120	285
Milk Products	90	.....	322
Miscellaneous	1,115	429	2,256
	$2,415	$739	$5,200

INDICATORS

Cocoa imported into the United States during the first six months of 1943 totaled 2,008,433 bags, compared to 799,572 bags for the first six months of 1942, and to 3,103,307 bags for the like 1941 period.

Flour production in June, 1943, by mills accounting for 67 percent of United States production, totaled 12,554,425 sacks, according to *The Northwestern Miller*. This compared to production of 10,879,639 sacks in June, 1942, and to 11,334,564 sacks in May, 1943.

Pea production for canning in Wisconsin this year is expected to total around 135,000 tons, 4,000 tons over last year's record crop and 64,000 tons over the 1932-1941 average. This output is expected to be about one-third of total United States production.

Pimientos canned in 1942 are now reported by the National Canners Association to have totaled 646,182 cases.

Pea acreage for processing in 1943 is reported by the National Canners Association at 485,530 acres planted, compared to 434,220 acres harvested last year. Production for 1943 is forecast at 454,370 tons compared to 424,010 tons harvested a year ago.

Beet acreage for processing in 1943 is forecast at 19,320 acres, 7 percent over 1942 plantings, according to the U. S. Department of Agriculture.

Lima bean acreage for planting in 1943 is estimated to be 70,250 acres, a drop of 7 percent below 1942 acres planted.

Snap bean production for processing this year is expected to total 247,870 tons, compared to 234,800 tons produced last year.

Tomatoes for processing in 1943 are expected to be planted on 615,800 acres, 1.8 percent under 1942 plantings.

Cabbage for kraut this year is forecast at 15,900 acres, up 3.6 percent over last year's acreage.

Pimiento acreage this year for processing is expected to be 11,510 acres, compared to 11,580 acres in 1942.

Pickle acreage this year, according to the National Pickle Packers Association, is 77,714 acres. The acreage in 1942 was 123,720 acres.

Oleomargarine sales in May, 1943, as indicated by sales of internal revenue stamps, were 14,820,422 lb., 13 percent lower than sales in May, 1942. For the first 5 months of 1943 sales were 218,130,727 lb., 53 percent above the corresponding 1942 period.

Cheese, American, produced in May, 1943, totaled 87,560,000 lb., compared to 117,085,000 lb. in May, 1942, and to an average of 57,467,000 lb. for May in 1932-1941.

Cheese, American, produced in the first 5 months of 1943 totaled 305,825,000 lb., compared to 407,965,000 lb. for the corresponding 1942 period and 187,532,000 lb. as an average for the period during the years 1932-1941.

Butter, creamery, produced in May, 1943, totaled 190,535,000 lb., compared to 203,360,000 lb. in May, 1942, and to an average of 189,900,000 lb. for May in 1932-1941.

Butter, creamery, produced in the first 5 months of 1943 totaled 725,670,000 lb., compared to 726,710,000 lb. produced in the corresponding months of 1942, and to an average for the period in 1932-1941 of 700,337,000 pounds.

Evaporated milk produced in May, 1943, totaled 376,015,000 lb., down 16 percent below output in May, 1942, but 33 percent over the 1937-1941 average output.

Condensed milk, all kinds, produced in May, 1943, amounted to 92,333,000 lb., compared to 85,821,000 lb. produced in May, 1942.

Milk, whole, dried, produced in May, 1943, was 13,750,000 lb., 178 percent over output in May, 1942, and 423 percent above the 1937-1941 May average.

Milk, dried, skim, produced in May, 1943, totaled 59,975,000 lb., off 25 percent from production in May, 1942, but 12 percent above the 1932-1941 average May output.

Dried egg products produced in May, 1942, totaled 28,136,000 lb., compared to 22,191,000 lb. output for the same 1942 month.

Chicks hatched in May, 1943, were 300,361,000, an increase of 23 percent over output in May, 1942, and 47 percent over the 1938-1942 average May output.

Fruits, frozen, in storage on June 1, 1943, totaled 96,244,000 lb., compared to 106,538,000 lb., on June 1, 1942, and to a 1938-1942 June average of 90,860,000 pounds.

Vegetables, frozen, in storage on June 1, 1943, were 56,403,000 lb., compared to 49,548,000 lb. a year earlier.

Butter, creamery, in storage on June 1, 1943, was 82,666,000 lb., compared to 64,720,000 lb. a year earlier and to a June 1 average in 1938-1942 of 57,336,000 pounds.

Cheese, all kinds, in storage on June 1, 1943, totaled 97,344,000 lb., compared to 227,689,000 lb. on June 1, 1942, and to an average of 121,188,000 lb. on June 1st in 1938-1942.

Eggs, case equivalent, in storage on June 1, 1943, amounted to 14,924,000 cases, compared to 12,914,000 cases a month earlier and to an average for June 1 in 1938-1942 of 9,794,000 cases.

Poultry, frozen, all kinds, in storage on June 1, 1943, totaled 20,926,000 lb., compared to 80,242,000 lb. on June 1, 1942, and to an average for June 1, in 1938-1942 of 72,685,000 pounds.

Meat, all kinds, in cure and frozen storage, on June 1, 1943, totaled 711,496,000 lb., compared to 774,612,000 lb. on June 1, 1942, and to a June 1st average in 1938-1942 of 725,219,000 pounds.

Lard in storage on June 1, 1943, was 153,813,000 lb. and rendered pork fat on the same date was 9,590,000 lb. The corresponding figures a year earlier were 110,405,000 lb. and 7,590,000 lb. The combined figures for the average of the years 1938-1942 were 207,740,000 pounds.

Business activity index of *Business Week* for July 12, 1943, was 208.8. A month earlier this index was 207.2 and the figure was 182.1 for the corresponding 1942 date.

Cost of living index of National Industrial Conference Board was 104.3 in June, 1943, compared to 104.2 in May, 1943, and to 97.4 in June, 1942.

GOOD?

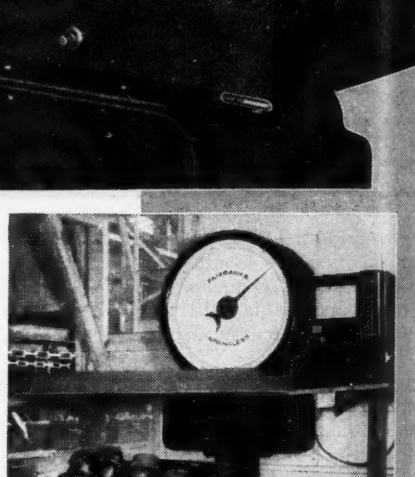
They have to be to get where they are!

In good light or bad . . . operated by experienced weighmen or novices . . . weighing all kinds of commodities . . . Fairbanks Printomatic Scales have proved to the world that they have what it takes! They eliminate human errors, speed up weighing operations, and provide a PRINTED record showing what was weighed, who weighed it, and when.

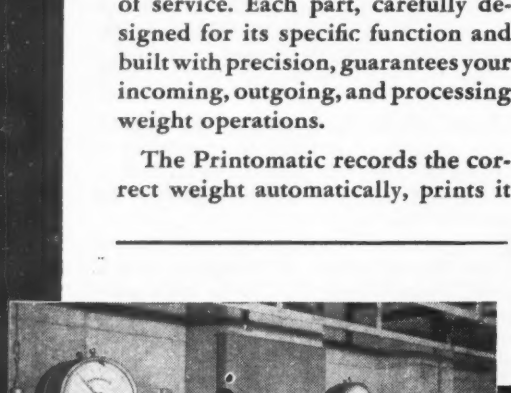
Fairbanks Scales have proved their reliability through their 113 years of service. Each part, carefully designed for its specific function and built with precision, guarantees your incoming, outgoing, and processing weight operations.

The Printomatic records the correct weight automatically, prints it on a roll tape, weigh ticket, or combination of both, or on gummed tickets. Adaptation of Fairbanks Printomatic Scales to weighing problems, simple or complicated, is practically unlimited. Why not investigate what these scales can do for you? Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.

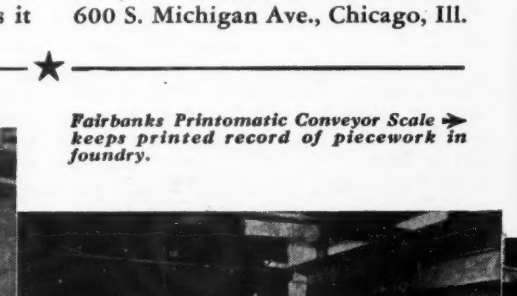
★



Fairbanks Printomatic Conveyor Scale → keeps printed record of piecework in foundry.



↑ Fairbanks Printomatics recording meat shipments to retailers. Each of 221 different kinds of meat is given a designating number.



↑ Fairbanks Coal Mine Car Scale with Printomatic weighs mine cars in motion, protecting employer and miner.

Fairbanks Portable Dial → Scale with Printomatic weighing and printing records of meat to retailers.

FAIRBANKS-MORSE

DIESEL ENGINES
PUMPS
MOTORS
GENERATORS
SCALES

WATER SYSTEMS
FARM EQUIPMENT
STOKERS
AIR CONDITIONERS
RAILROAD EQUIPMENT

FAIRBANKS SCALES

Scales

MEN • JOBS • COMPANIES

INDUSTRY

American Home Products Corp., Jersey City, N. J., has completed negotiations to acquire Belle Center Creamery & Cheese Co., producers of cheese, butter and other dairy products and byproducts, and its affiliate, O. M. S. Corp., manufacturer of milk sugar, with both companies in Belle Center, Ohio. The O. M. S. Corp. manufactures milk sugar from the whey produced by the creamery company.

Anheuser-Busch, Inc.'s St. Louis, Mo., plant, which under normal conditions handles from 110,000 to 112,000 bu. of corn per week, has had to cut its grind to between 55,000 and 60,000 bu., due to the present shortage of corn. The plant operates independently of the company's manufacture of beer and produces sirup, glucose, starch and other corn products.

Burry Biscuit Corp., Elizabeth, N. J., has recently purchased L. M. Peterson Co., Inc., Brooklyn wafer manufacturer.

Carnation Co. of Milwaukee, Wis., has begun construction of a milk powdering and butter manufacturing plant in Dadeville, Ala. The entire output will be sold for Army and Lend-Lease use.

Coca-Cola Co., Atlanta, Ga., recently installed an electrically operated news strip at Times Square in New York City, which is completely within local dimout regulations. The news strip, one of the largest of its kind in the world, is a 40-ft. bank of electric lights. It flashes the news a few seconds after a typewritten bulletin is handed to an operator.

Emmart Packing Co., Louisville, Ky., in conjunction with Ready Foods Co., Inc., Chicago, Ill., is now processing and shipping canned cyvina tushonka to Russia through Lend-Lease.

Falfurrias Creamery Co., Falfurrias, Tex., manufacturer of sweet butter for 30 years, plans to manufacture cottage and Swiss cheese in the near future.

Froedtert Grain & Malting Co., Milwaukee, Wis., to meet the shortage of brewing materials, has developed and placed on the market a gelatinized substitute known as Fromal.

General Foods Corp., New York, N. Y., has signed a contract to purchase Ray-Maling Co., Inc., Hillsboro, Ore., packer of canned and quick frozen fruits and vegetables. The contract is subject to approval by Ray-Maling stockholders.

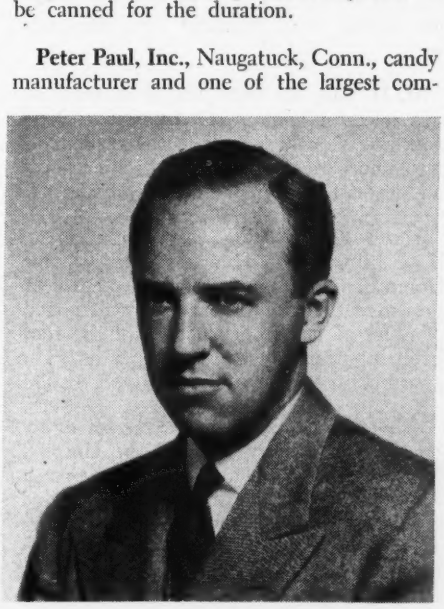
Inter-continental Pork Packers, Saskatoon, Sask., Canada, has begun construction of a $50,000 addition to its plant.

BORDEN PRESENTS AWARDS

W. A. Wentworth (right), director of industry relations for Borden Co., New York, N. Y., presenting the 1943 Borden Awards at the 38th annual meeting of American Dairy Science Association held at Columbia, Mo. A gold medal and $1,000 went to Byron H. Webb (left), of the Bureau of Dairy Industry of the USDA, for outstanding research in processing milk products, and Lane A. Moore (center), associate professor of animal husbandry at the University of Maryland, for his research on the nutrition of dairy cattle.

National Canners Association's home economics division has issued a new 12-page publication entitled, "Quantity Recipes Using Canned Foods." The recipes are simple and use those products expected to be canned for the duration.

Peter Paul, Inc., Naugatuck, Conn., candy manufacturer and one of the largest commercial outlets for coconut in the world, has organized a shipping fleet of its own to assure steady future deliveries of coconut. The company has leased plants in Puerto Rico and also in Honduras to process the product.



JOHN P. CLARKIN

Formerly sales manager of Pepsi-Cola Co., Long Island City, N. Y., John P. Clarkin has been elected vice-president in charge of sales for the organization. Mr. Clarkin has been associated with the carbonated beverage industry for more than 14 years, and before joining Pepsi-Cola in 1940 he was general manager of one of the largest soft drink plants in the East.

Raisin Producers Association has been newly organized in Fresno, Calif., to supervise the government-sponsored program of converting all the 1943 crop of raisin variety grapes into raisins.

Sunshine Packing Co. plans to add a $40,000 to $50,000 cold-pack fruit unit to its plant in North East, Pa.

West Tennessee Soya Mills, Inc., in Tiptonville, Tenn., has been granted a charter to grind and process soybeans and other legumes.

PERSONNEL

R. W. Arengo-Jones has been elected technical director of the soup division for Thomas J. Lipton, Ltd., with headquarters at Toronto, Canada. For twelve years previous to his appointment, he had been doing research work with the Dominion Department of Agriculture.

William L. Campbell, formerly vice-president in charge of production, Kroger Grocery & Baking Co., Cincinnati, Ohio, is now vice-president in charge of production for Brown Co., paper manufacturer in Berlin, N. H.

W. O. FROHRING

W. O. Frohring, newly elected director of American Home Products Corp., Jersey City, N. J., has been named special technical consultant to the corporation and its subsidiaries. In his new post, Mr. Frohring will concentrate on research and development of new products introduced after the war, and will play an important part in the postwar planning program of the company.

J. H. LOEFFLER

Standard Brands, Inc., New York, N. Y., has appointed J. H. Loeffler to the position of director of purchases for the company. Mr. Loeffler will continue to handle the purchasing of grains, molasses and other basic raw materials and will also take general charge of the purchasing department. In addition to his duties for Standard Brands, he is consultant to WPB.

Robert Dillman, of the Blue Island, Ill., plant of Libby, McNeill & Libby, has returned to Washington, D. C., again as consultant to the Container Division of WPB.

C. C. Hadley, Indianapolis, has been elected executive assistant to Robert C. Hibben, executive secretary of International Association of Ice Cream Manufacturers. Mr. Hadley has been general secretary of Indiana Manufacturers of Dairy Products Association for the past two years.

Roderick P. Hart, manager of the Lawrence, Mass., branch of Swift & Co., has been appointed manager of the Fall River branch, succeeding James Vaughn, who has retired.

E. J. Kane, formerly research chemist in the packaging division of American Can Co., New York, N. Y., is now packaging supervisor for Continental Foods Co., a subsidiary of Thomas J. Lipton, Inc., Hoboken, N. J.

Carl N. Lovegren has been elected president of the Canners League of California for the coming year. A. W. Eames, H. E. Gray, Preston McKinney and W. S. Everts have been appointed vice-presidents.

Burt C. Olney, formerly president of Snider Packing Corp., becomes general manager of Snider Division of General Foods Corp., following the sale of the company to General Foods.

H. Leslie Popp has been named president of Perfection Biscuit Co., Fort Wayne, Ind., succeeding J. B. Spatz, who becomes chairman of the board.

Bryce Prindle has been appointed field supervisor in dehydration for the U. S. Army Jersey City Quartermaster Depot. He will cover the Middle Atlantic area, ranging from Metropolitan New York to North Carolina, to speed delivery of dehydrated foods to the armed forces. He will assist dehydrators in this area to get their plants into full operation, advise them on priorities, check on the supply of raw materials and assist in many other ways.

Agnes G. Reasor has been named home economics director of Cereal Institute, Inc., and will devote her time to research in behalf of the cereal breakfast food manufacturers.

M. H. Saxe has been elected manager of bulk sales for Lamont, Corliss & Co., New York, N. Y., which include chocolate coatings, chocolate liquors, cocoas and chocolate flavors for the manufacturing trade.

Hazel K. Stiebeling, assistant chief of U. S. Bureau of Human Nutrition and Home Economics in Washington, has been presented the seventh Borden award in recognition of her years of study of the food habits of people in the United States. The award consists of a gold medal and $1,000.

Elmer H. Stotz, formerly director of the chemical laboratory at McLean Hospital, Waverly, Mass., and a member of the teaching staff in biochemistry in Havard Medical School, has been appointed to the position of professor of agricultural chemistry and biochemistry at Cornell and head of the division of chemistry at New York State Agricultural Experiment Station in Geneva, N. Y. Mr. Stotz succeeds Donald K. Tressler, who resigned earlier in the year.

F. E. Walrod has resigned from American Molasses Co. and Nulomoline Co. to accept a position with Brolite Co., Chicago, Ill. In his new position, Mr. Walrod will have charge of the New York office and will service bakers situated along the entire Atlantic coast.

DEATHS

Charles W. Amburn, 51, sales manager in the Indianapolis, Ind., area for Standard Brands, Inc., New York, N. Y., recently, in Indianapolis.

George B. Clifford, Sr., 85, a founder and former president of Cream of Wheat Corp., Minneapolis, Minn., recently, in Minneapolis.

Edward J. Dugan, president of Dugan Brothers, Inc., wholesale bakers, July 19, in Seacliff, Long Island.

Fred C. Haller, a member of American Bakers Association's board of governors and active in the ABA house-to-house branch, June 27, in Wilkinsburg, Pa. Mr. Haller had been president of Haller Bakery Co. and of Haller Oven Co., both in Pittsburgh, Pa.

Dr. Thorvald Lyngholm, 53, formerly a member of the staff of the United States Food Administration under Herbert Hoover from 1917–1919, July 1, in Mineola, N. Y. After World War I, he toured Belgium, France and Germany arranging diets for children.

Richard Mommers, superintendent of American Sugar Refining Co.'s plant at Baltimore, Md., and one of the outstanding sugar operating executives in this country, recently, in Baltimore.

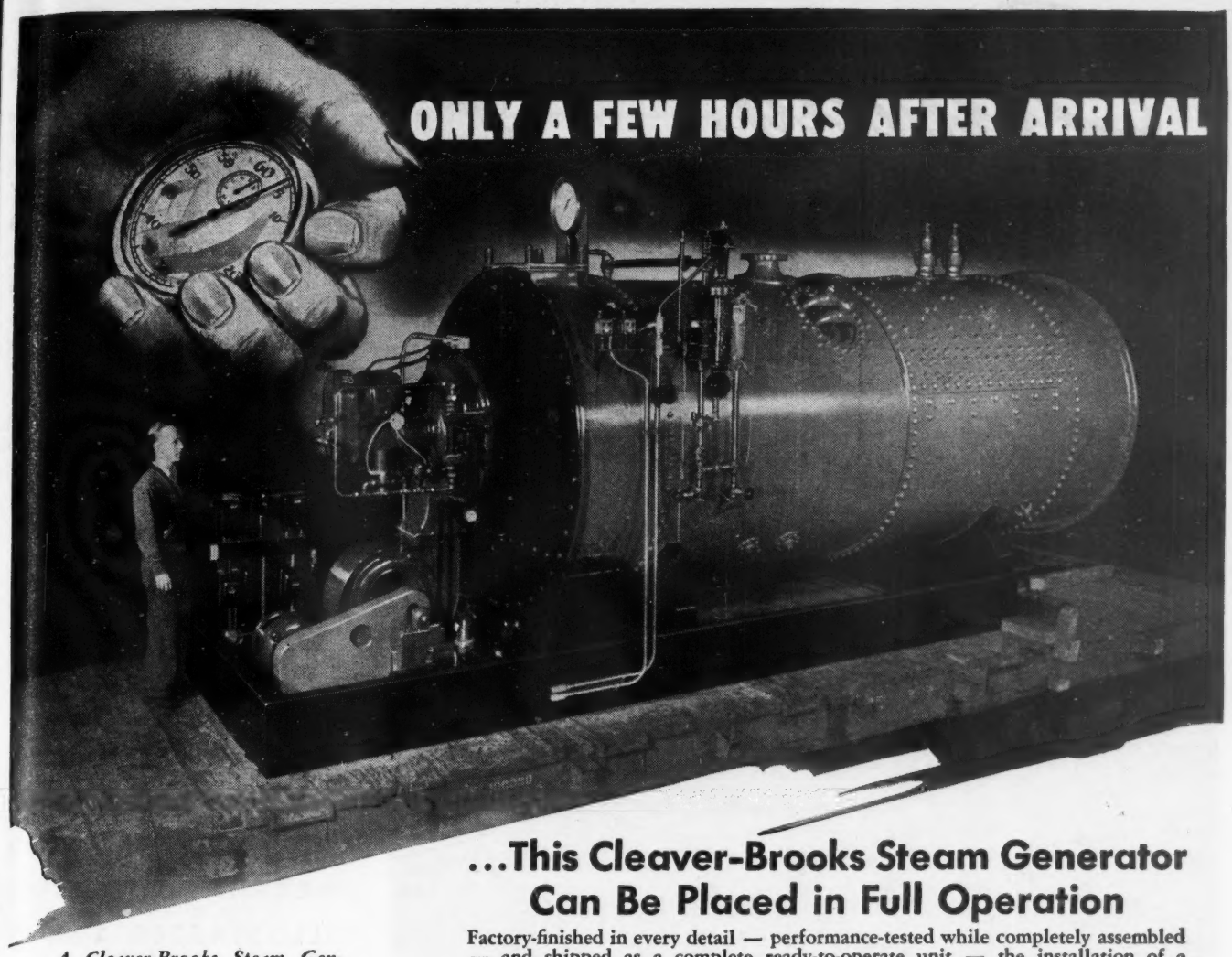
Adolph J. Western, 53, former president of Great Eastern Coffee & Tea Co., St. Louis, Mo., recently, in Webster Groves, Mo.

ASSOCIATED INDUSTRIES

American Can Co. has announced that Donald S. Brownlee, formerly research bacteriologist in the Maywood, Ill., plant, has taken charge of packaging research for Owen-Illinois Can Co., Toledo, Ohio.

Cleaver-Brooks Co., Milwaukee, Wis.; the Great Western Division, Pittsburgh, Calif., plant of Dow Chemical Co.; the Baton Rouge, La., plant and the Deepwater plant and dye works in Wilmington, Del., of Ethyl Corp.; Link-Belt Co., Chicago, Ill.; the plastics division of Monsanto Chemical Co. in Springfield, Mass.; Resinous Products & Chemical Co., Philadelphia, Pa.; Thompson Machinery Co., Belleville, N. J.; and the Taylor Instrument Cos., South Rochester, N. Y., have been presented the Army-Navy "E" award for excellence in production. Homestead Valve Manufacturing Co., Inc., Coraopolis, Pa., has been awarded a gold star for its Maritime "M" pennant, signifying outstanding achievement in production.

Hinde & Dauch Paper Co., Sandusky, Ohio, has published an illustrated booklet entitled, "How to Ship by Air Express," covering all the important phases of shipping by air.



A Cleaver-Brooks Steam Generator Just Out of Factory Test-Pit—Ready for Shipment When Blocked and Trim Removed.

...This Cleaver-Brooks Steam Generator Can Be Placed in Full Operation

Factory-finished in every detail — performance-tested while completely assembled — and shipped as a complete ready-to-operate unit — the installation of a Cleaver-Brooks steam generator is only a matter of hours, rather than weeks of time. A job that is usually costly in time and money is reduced to a few simple piping and electrical connections.

These modern oil-fired steam generators are the answer to the demand of American industry and the military services for a steam plant with these advantages:

- —greatest fuel economy — 80% efficiency guaranteed.
- —quick steaming—for any emergency or fluctuating loads.
- —clean — no smoke, ashes, soot or clinkers.
- —compact "packaged" construction saves space.
- —positive blower air supply eliminates high, costly stack; only a simple, short vent is required.
- —four-pass down-draft construction gets all possible heat from fuel.
- —one source and one responsibility for the complete unit — Cleaver-Brooks.

Whatever your present or future need for steam — within the range of a single installation (20 to 500 HP. — pressures 15 to 200 lbs.) or that of a battery of Cleaver-Brooks Steam Generators, secure full information now in anticipation of the time when normal conditions return.

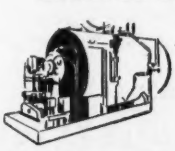
CLEAVER-BROOKS COMPANY, 5103 N. 33rd St., Milwaukee, U.S.A.

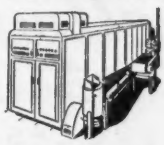
WHY INSTALLATION TIME IS CUT!

- ✓ *No Stack*
- ✓ *No Brickwork*
- ✓ *No Special Foundations*
- ✓ *No Breeching*
- ✓ *No Multiple Sources of Supply*

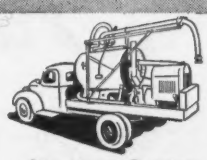
Cleaver-Brooks
STEAM
GENERATORS

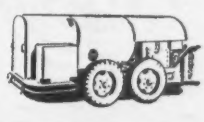
CLEAVER-BROOKS PRODUCTS INCLUDE:


Steam Generators


Food Dehydrators

Tank Car Heaters


Bituminous Boosters

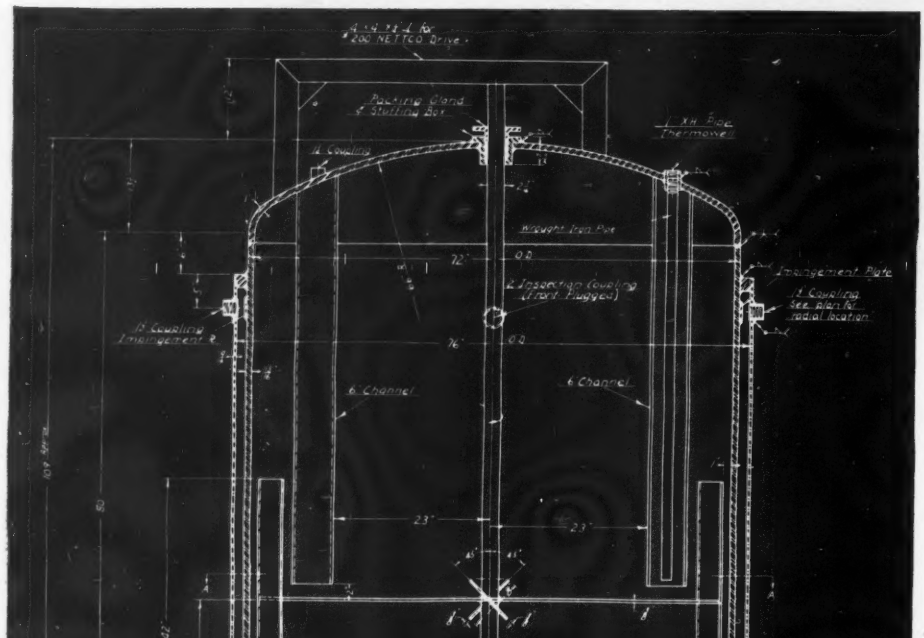

Special Military Equipment

Sturdy, Efficient, Adaptable

PATTERSON - KELLEY STEAM-JACKETED MIXING KETTLE

A standard type jacketed kettle fitted with a specially designed Patterson-Kelley mixer. 76" O.D. x 109" high over the shell exclusive of supports. Constructed to the A.S.M.E. code for a working pressure of 150 lbs.

—THANKS TO A SPECIAL TYPE OF PATTERSON-KELLEY MIXER



A.S.M.E. APPROVED DRAWING OF KETTLE ILLUSTRATED ABOVE

By varying the type, physical dimensions and rate of speed of the mixing mechanism, this Patterson-Kelley Steam-Jacketed Mixing Kettle can be adapted to any process requiring this kind of equipment.

ADVANCE NOTICE—Bulletin No. 203, a new informative circular on Patterson-Kelley equipment for the food and process industries, is going to press. Write for your copy today.

EST. 1880

PATTERSON-KELLEY *FOR DEPENDABLE, ECONOMICAL SERVICE*

THE Patterson-Kelley CO., INC.

114 WARREN ST., EAST STROUDSBURG, PA.

MANUFACTURERS FOR THE FOOD AND PROCESS INDUSTRIES

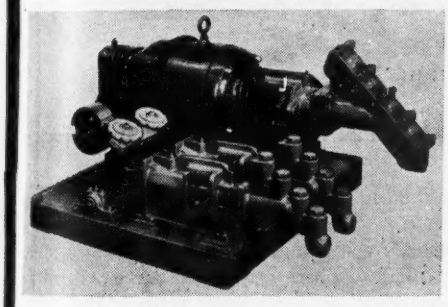
FOOD EQUIPMENT NEWS

Dry Mixer

H. K. PORTER CO., INC., 49th and Harrison Sts., Pittsburgh, Pa., has brought out a double cone blender for the rapid mixing of dry powders. This improved blender incorporates a device within the cone that prevents any two particles of the material from following the same path and breaks up agglomerates. It is claimed that, in batches run in 15 minutes, uniformity does not vary more than 1 percent. It is also claimed that the new design permits the processing of hygroscopic powders without agglomeration.

Three-Liquid Pump

MILTON ROY PUMPS, 1394 East Mermaid Ave., Philadelphia, Pa., has developed a single pump for handling three different liquids—in this case, two



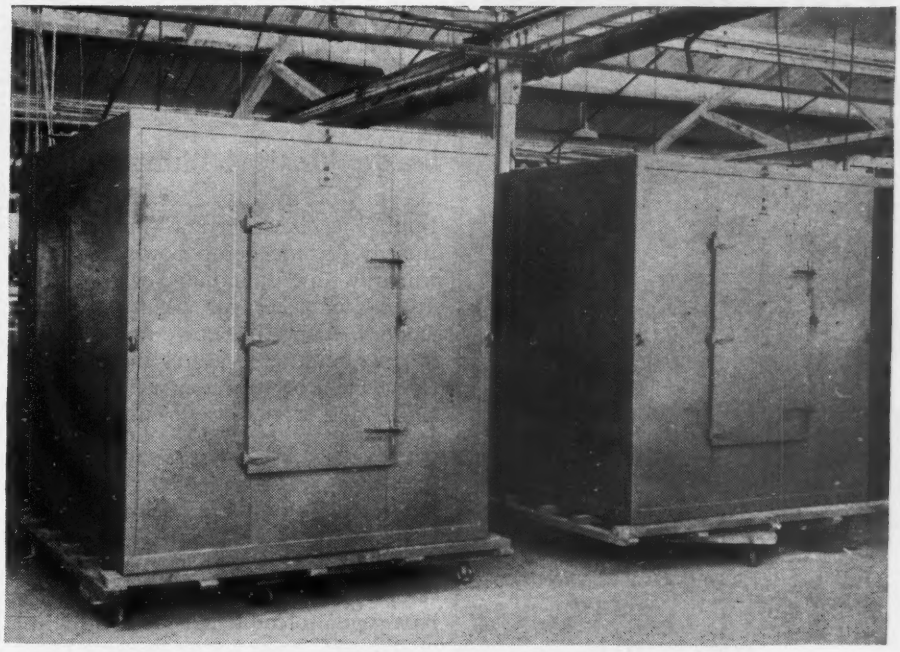
Step-valve pump for handling three liquids at once.

light liquids and one viscous liquid. Delivery is performed at various required rates of flow to control accurately the volume of each in a mixing operation. This new pump is of the Roy step-valve design.

Laboratory Detergent

STANDARD SCIENTIFIC SUPPLY CORP., 34 West 4th St., New York, is now distributing "Alconol," a detergent said to be particularly suitable for use in laboratories. The maker states that this product is primarily a wetting agent, acting by lowering the surface tension rather than by chemical action. It can be applied to all types of laboratory utensils or equipment, whether of glass, porcelain or metal. It produces abundant lather in water of any hardness, without producing any insoluble metal soaps. It will also lather in acid solutions. It is further claimed that it cleanses without leaving any film.

The product is packaged in dry form, and is available in 3-lb. packages or in bulk. It is used by adding 1 oz. per gallon to warm tap water.



Portable refrigerated carriers developed for handling food products

Refrigerated Carriers

DEVELOPED TO meet war needs in food shipment, Weber Showcase and Fixture Co., 5700 Avalon Blvd., Los Angeles, Calif., is building portable refrigerated carriers of 150 cu.ft. capacity. The carriers can be used for handling frozen products, maintaining a temperature of 8 to 10 deg. F., or can maintain a temperature of 35 deg. F. for handling such fresh products, as eggs, fruits or vegetables.

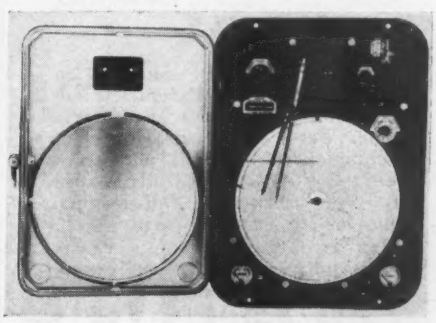
The carriers can be handled by slings and overhead equipment, or can be equipped with runners or skids for handling by truck. They can be equipped for operation by either electric motor or gasoline engine. Dimensions are 9 ft. 6 in. long by 6 ft. wide by 6 ft. 6 in. high. Weight, fully equipped, is 5,500 lb. Refrigeration is by means of an automatic compression unit using Freon refrigerant.

Tubing for Food Plants

PLASTIC tubing with the flexibility of rubber, adapted particularly for use in such food plants as breweries and wineries, has been brought out by Goodyear Tire and Rubber Co., Akron, Ohio. The makers state that the new tubing is, in some respects, superior to rubber tubing, and because the raw materials are less scarce, it is available for a wide range of purposes for which rubber tubing is prohibited. The material resists extremes of temperatures about as well as rubber does. It will resist pressures of 40 lb. when unbraided, and up to more than 200 lb. when braided. The unbraided tube is transparent, or can be produced in opaque or color finishes. In some services it is said to be less prone to pick up odors than rubber tubing. The size range is the same as for rubber tubing before the war.

Air-Operated Controller

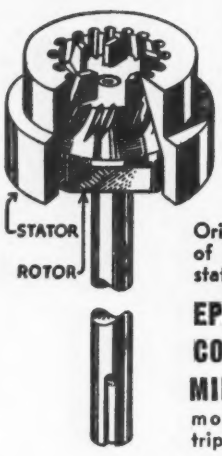
BRISTOL CO., Waterbury, Conn., has brought out an air-operated automatic control instrument known as the "Convertible Free-Vane Controller." This instrument is made for the automatic control of temperature, flow, liquid level, pressure, draft, humidity,



Convertible air-operated automatic control instrument.

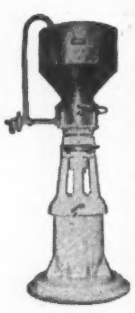
pH value, and time program. The feature of the new instrument is that the user can convert from one type of control system to another.

PLUS Your Product
...AND SHOW A GREATER PROFIT!



Original design of rotor and stator in

EPPENBACH COLLOIDAL MILL assures more efficient triple action.



AMAZING RESULTS have been achieved with the Eppenbach Colloidal Mills. Products, as wide apart as emulsions, serums, lipsticks, rubber compounds, have acquired new, improved qualities, because the Eppenbach is so far ahead in its triple action.

It's more powerful, the mixing turbines break liquids more violently. Clearances can be so finely adjusted, they seem practically closed. The teeth in the rotor and stator shear the materials mechanically—then the smooth surfaces hydraulically shear to any required particle size.

Perfect control is assured. No air is sucked in. Micrometric adjustments are made without stopping. Water jackets provide right temperatures. Rotor is only moving part—and it's conically shaped to take up wear. Self-cleaning, simple, rugged. *Write us.*

EPPENBACH
INCORPORATED
Processing Equipment for Over 30 Years
44-02 11th STREET
LONG ISLAND CITY, N. Y.

This instrument operates on the "Free-Vane" principle used in other instruments made by this company. It is offered in the following types: Monoset (on and off), Ampliset (throttling), Preset, Reset, and Magniset. The adjustments for fitting the controller to the requirements of the process are located on a dial board above the chart.

Large Vertical Pumps

LAYNE & BOWLER, INC., Memphis, Tenn., has developed a line of high capacity turbine pump bowls, intended primarily for pumping water from streams or lakes for industrial water supplies. Capacities range up to 16,000 gal. per minute. Features include high efficiencies throughout a wide capacity range, and a non-overloading type of impeller.

Gage Protector

LAPP INSULATOR CO., INC., Chemical Porcelain Div., Le Roy, N. Y., has developed a chemical porcelain snubber type gage protector that permits the use of standard direct acting pressure gages, without danger of damage to the gage or contamination of the product.

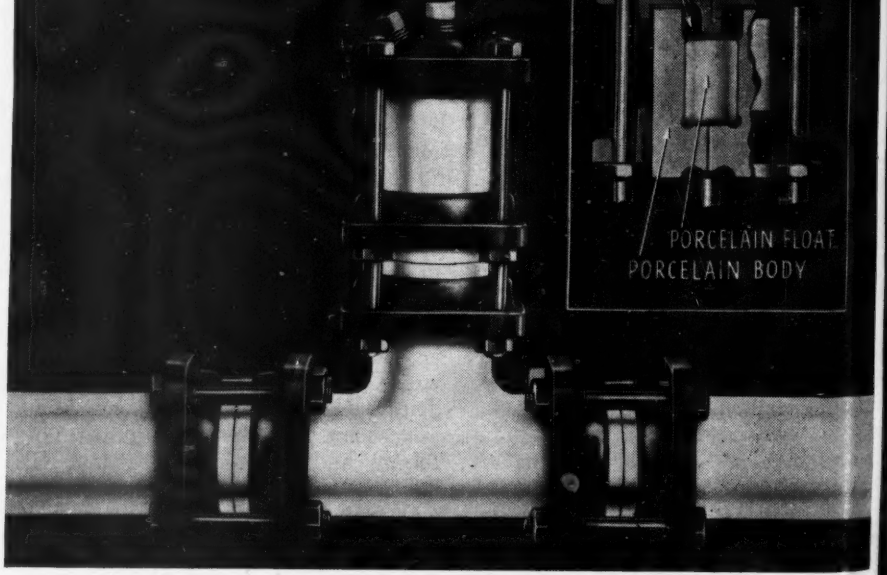
The protector consists of a chamber of chemical porcelain enclosing a porcelain float, ground and lapped to a smooth precision fit. The gage is mounted in the cap in a standard ¼ in. pipe tap. The cavity between the float and the gage is filled with neutral oil. Pressure from the line or vessel below is transmitted through the float to the oil above. Danger of seepage past the float is minimized by the smooth tight fit and by the fact that the pressure above and below the float are equal. This protector is designed to fit Lapp porcelain pipe of 1 in. inside diameter.

Scoop Truck

TOWMOTOR CORP., 1226 East 152nd St., Cleveland, Ohio, has brought out a shovel type scoop that can be interchanged with standard forks on the standard fork lift trucks, for use in picking up, carrying and dumping every type of loose bulk material. This is

Industrial truck with scoop attachment.

available in capacities from 8 to 25 cu.ft. The scoops are designed for speedy handling and are manually controlled. They can pick up or dump materials at any point within the lift range. Resetting to digging or carrying position after dumping is accom-



Gage protector of porcelain for lines carrying corrosive liquids.

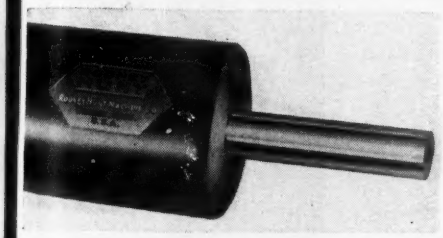
plished by lowering to floor level until spring-operated catches automatically take hold. An optional feature is an anti-spilling device that fits over the front lip of the scoop, and can be easily pulled out of position for loading, but which remains in position during dumping, with the load spilling out freely beneath it.

Boiler Feed System

JOHNSON CORP., Three Rivers, Mich., has expanded its line of high temperature boiler feed systems to include a new, larger size of pumping unit, making the equipment available for use with boilers from 30 to 150 boiler horsepower, at pressures up to 150 lb. In addition, all sizes are now available with a coupled type of pump, permitting the use of a standard type motor, as well as the close-coupled pump used on the original design.

Plastic Covered Rolls

RODNEY HUNT MACHINE CO., Orange, Mass., has brought out "Shaf-tite" plastic covered rolls. These are basically



Roll with plastic covering.

all-metal rolls, but the surface is covered with a plastic that resists acids and alkalis. The makers also state that this surface is easily cleaned and has a high wear resistance. Uses suggested for these plastic covered rolls are as guide rolls, conveyor rolls and idlers, wherever exposed iron or steel is objectionable, but where a hard, smooth surface is desired.

Alloy-Protected Conveyor Bearings

HAYNES STEELITE CO., unit of Union Carbide and Carbon Corp., 30 East 42nd St., New York, reports that hard alloy bearings, and bearing gudgeons hard-faced with a similar alloy, have outworn bronze bearings by a service life of over 12 to 1 in a corn steamer conveyor at the plant of Kellogg Co. Battle Creek, Mich. In this operation no lubrication is possible, as contamination of the product by lubricant must be avoided. Also, paste from the steamed corn gets into the bearings, causing both wear and corrosion. This was so rapid with bronze bearings and gudgeons that they had to

FOOD is a WEAPON and...
REFRIGERATION *makes it Mighty!*

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to make

the weapons of WAR

and

MEN *to* MAN

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The power that turns the wheels of war industry, or moves battleships, air fleets, tanks, and trucks into battle, is no more vital than the power—strength, vigor, endurance—that help *men* work or fight! And it's FOOD that "fuels" this manpower in shops or in battle.

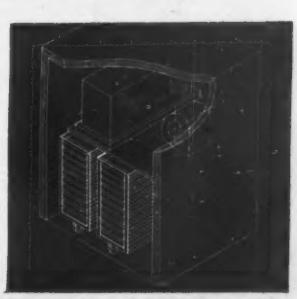
Keeping this "fuel" effective, protecting its health-giving, body-building "power"—over long land or sea routes—from field to table, galley or mess, is the big wartime task of MECHANICAL REFRIGERATION . . .

But it's your PRESENT Refrigeration Equipment that must handle most of the load . . . Helping you keep your present equipment up to capacity, is one of Vilter's responsibilities, too. Call on Vilter's skill and knowledge for this important maintenance job.

Vilter FRIGID BLAST Freezer

Latest Vilter development — saves food freezing time and cost.

Custom-designed to fit all needs, any capacity. Available, as are other Vilter Products, on "Preferred Order".



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It is almost as easy to use as a radio. No previous experience is needed to make fast, accurate tests. As a vital production control instrument used in the dehydration processes, the Steinlite can be used and operated right near the driers.

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Operates on the radio frequency impedance principle . . . calibrated against official Government oven methods. Sold on 10 day FREE TRIAL; no deposit; early shipments. Write for catalog.

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REEVES Glengarrie POPLIN

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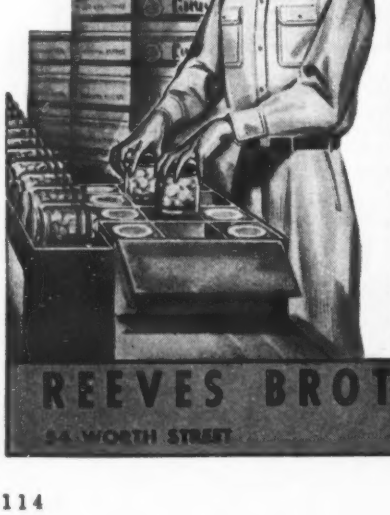

Uniforms that are neat in appearance and easy to keep clean are essential in the food industry. So specify *Reeves* famous fabrics for *your* uniforms.

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For matching shirts, specify GLENGARRIE POPLIN, a durable, stylish fabric in a wide range of colors. Both fabrics are Sanforized* against shrinking.

**Fabric shrinkage not more than 1% (U. S. Government Test CCC-T-191-a)*

See your nearest dealer for uniforms, sport and work clothes made from these famous fabrics, or write for colorful leaflet to:

OVER 60 to 80 million yards of Reeves Army Twill sold to the U. S. Army

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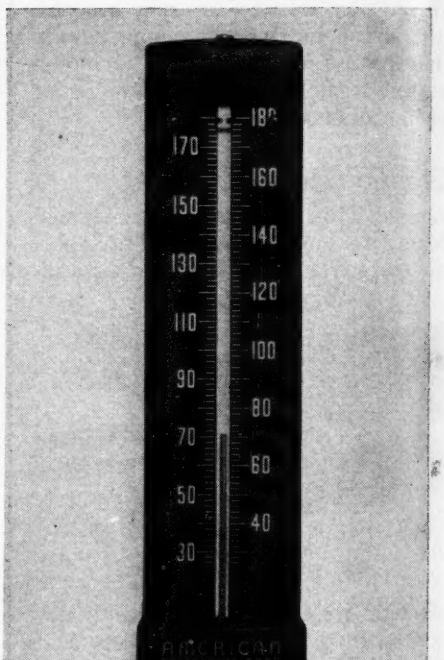
be replaced every 4 to 6 months. The first alloy bearings were installed in 1936. After 3½ years, these new bearings were inspected. As they showed but little wear, they were reinstalled and have been in service ever since.

Industrial Thermometer

AMERICAN SCHAEFFER & BUDENBERG INSTRUMENT DIVISION, Manning, Maxwell & Moore, Inc., Bridgeport, Conn., has brought out a new industrial thermometer in a pressed steel case designed to conserve the copper formerly used in bronze cases. Additional changes include: It can be furnished for back, side and oblique angles without the use of a ball joint. Scales and tubes are



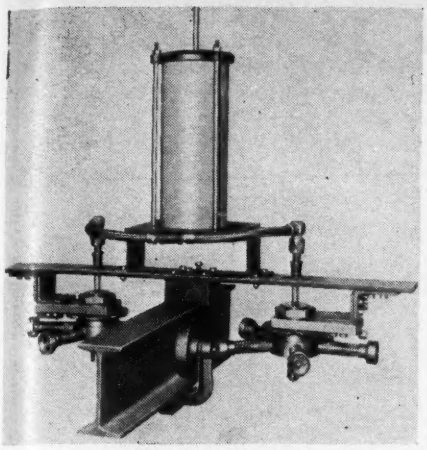
Industrial thermometer with pressed steel case.

placed to increase readability and the scale is made by a new method to make it more legible. The case is reinforced to give full structural stiffness. The case is highly resistant to corrosion, showing no bad effects after 100 hours exposure to salt brine spray.

The scale is black with yellow figures. The tube contains red reading mercury. The weight is one-third less than the present standard thermometer of the same size.

Conveyor Lubricator

FOR AUTOMATIC, controlled lubrication of the bearings of conveyor trolley wheels, a new device has been introduced by J. N. Fauver Co., Inc., 95 Selden Ave., Detroit, Mich. The maker



Automatic lubricator for conveyor trolley wheels.

recommends this lubricator particularly for food plant use because it avoids any drip that might contaminate the material being conveyed, and because its "every trip" lubrication gives better maintenance to conveyors passing through dryers, ovens or other hot zones.

The lubricator is mounted on the trolley rail so that it serves, simultaneously, the bearings of each pair of wheels every time they pass the lubrication point. It is driven by the travel of the conveyor, requiring no independent power.

As the trolley wheel approaches the lubricator, the hub engages the sleeve of one of five pumping units and rotates the lubricator. This forces the pumping unit inward, delivering a measured quantity of lubricant through the fitting to the wheel bearing.

Among advantages claimed for this lubricator are: Optional use of hard oil; elimination of drip; automatic operation; and reduction of maintenance cost. Reservoirs of 5 or 12 lb. capacity are standard.

Humidity Test Chamber

American Coils Co., 25 Lexington St., Newark, N. J., is now making a low and high temperature test chamber with automatic humidity control. This unit has the standard refrigeration equipment of the same company's low and high temperature test chambers and, in addition, an attachment for humidity control. The standard humidity range is—ambient to 140 deg. F.; ambient to 90 percent relative humidity. Special adaptation can be made for humidities below ambient if requirements are known.

Positive forced air circulation, that can be varied in volume, and temperatures with thermostatic control are provided in this fully automatic unit. Observation of products under test is provided by a door having five sealed and dehydrated panels of glass.

You Can't Afford Leaky Valves

- Repair parts are scarce
- New Valves require high priorities
- Your present Valves have to serve better-longer
- Regrinding helps make them last longer
- Note the Illustrations showing the six simple operations required

They're expensive and they may result in costly slow-downs and sometimes even shut-downs—which can't be tolerated in these critical times.

With proper care . . . periodic inspection to locate even slight leaks . . . and immediate repair, your valves will serve you better and last longer.

Lunkenheimer Valves are easy to keep in good operating condition. Seats and discs can be readily reground and all parts are quickly accessible without taking the valves out of the line. Properly cared for, they give you a practically permanent installation.

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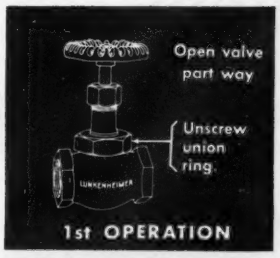
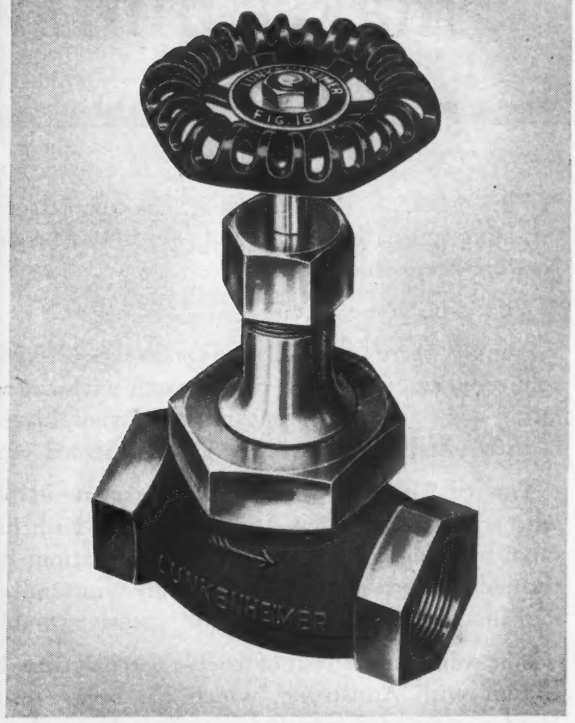
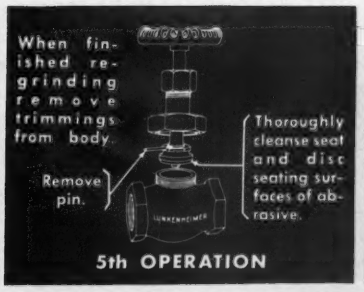
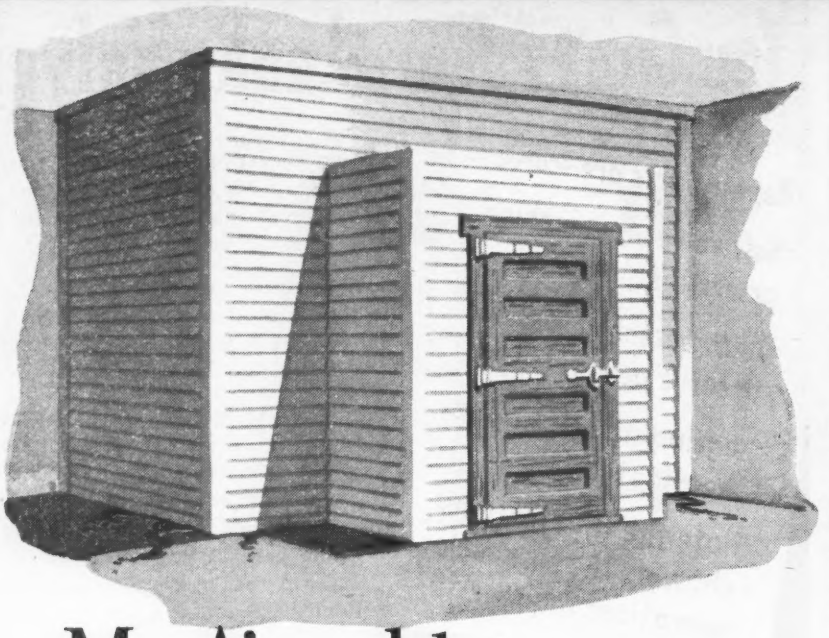




Replace trimmings in body and regrind.
Extension on bottom of hub should enter neck of body while regrinding.
Allow union ring to remain loose
4th OPERATION


When finished regrinding remove trimmings from body.
Remove pin.
Thoroughly cleanse seat and disc seating surfaces of abrasive.
5th OPERATION

LUNKENHEIMER VALVES



Mr. A's cold room makes him sweat

YES, Mr. A is in a tough spot. His compressor is running right around the clock, yet his cold room temperature keeps on climbing.

What's he going to do?

Frankly, there's not much he *can* do except tear out his cold room and start right from scratch with a new insulating job. To tear it out means loss of his storage facilities, and the probable spoilage of stored products.

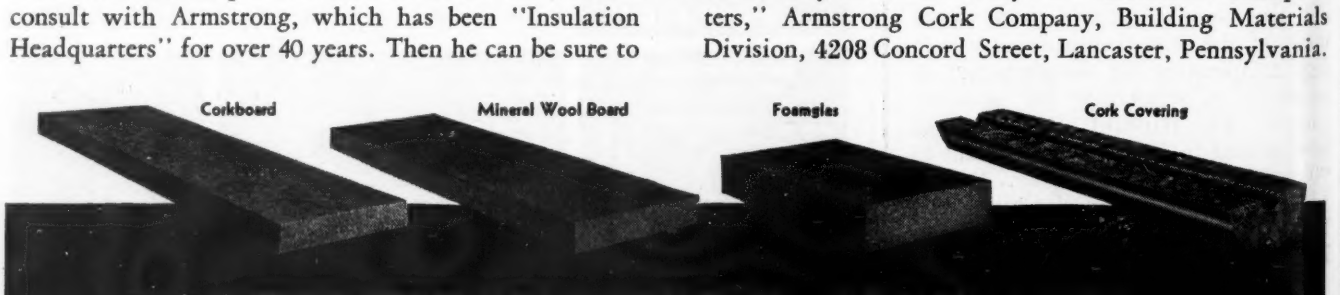
You see, Mr. A is one of those unfortunate individuals who tried to save a few dollars when he built his cold room by using a low-cost, unproved insulation. It's like the old proverb about being "penny-wise and pound-foolish" for now he's in a peck of expensive trouble.

If he wants to keep out of trouble a second time, he will consult with Armstrong, which has been "Insulation Headquarters" for over 40 years. Then he can be sure to avoid further difficulties, because at Armstrong's he'll find engineers who can give him experienced, unbiased advice on the insulation and the methods of installation he should use.

Unbiased?

Yes. Armstrong sells *three* efficient low-temperature insulation materials—Armstrong's Corkboard, Mineral Wool Board, and Foamglas. Regardless of what type of cold room he's building, Armstrong is ready and able to help select the one insulation or the combination of insulations—plus the erection specifications—that will be best for his particular job.

So, if it's complete facts about insulation that you want, why not write today to "Insulation Headquarters," Armstrong Cork Company, Building Materials Division, 4208 Concord Street, Lancaster, Pennsylvania.



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BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Air-purifying Equipment—Effective means of removing moisture, dirt and oil from compressed air through centrifugal force, to cut down high maintenance and replacement costs, is found in the 8-page bulletin, No. 543, "Aiding War Production with Clean, Dry Air," issued by Logan Engineering Co., 4900 Lawrence Ave., Chicago. Pictures of representative installations are also given.

Heating Equipment—Two new specification sheets containing steam ratings, dimensions and B.t.u. constants in chart form of five-way vertical unit heaters and horizontal discharge unit heaters have been published by Carrier Corp., Syracuse, N. Y.

Separating Equipment—A bulletin, No. 120, describing and illustrating the Stearns Magnetic Type "QS" screen filter separator, has been issued by Stearns Magnetic Mfg. Co., Milwaukee, Wis.

Vibrating Equipment—Many photographs, diagrams and typical applications of Jeffrey-Traylor electric vibrating equipment, for use in such operations as feeding, conveying, cooling, drying, packing and screening, are given in a 176-page illustrated Catalog 750, published by Jeffrey Manufacturing Co., Columbus, Ohio.

Water Heaters—A 6-page bulletin, No. 35-75C, illustrating and describing storage water heaters of the horizontal and vertical types with U-tube heating elements, and including details of construction, standard sizes, capacities and dimensions, has been issued by American District Steam Co., North Tonawanda, N. Y.

PLANT SUPPLIES

Blowers—Typical installations of single-stage and two-stage Wing axial-flow blowers with Voltrol-Vanes are illustrated in 8-page Bulletin CO-5 issued by L. J. Wing Mfg. Co., 154 W. 14th St., New York.

Flexible Shaft Joints—Of practical value to designers and engineers, photographs and diagrams of hinged and universal types of flexible joints, with operating ranges of from 0 to 360 deg., are shown in a 47-page catalog entitled "Beco Shaft Joints and Assemblies," issued by Brooks Equipment Corp., 90 West St., New York.

Fuel Supply Systems—As a means of insuring continued plant operation, reducing operating costs and salvaging waste factory gases, the use of "Algas" units is described and illustrated in a 20-page catalog issued by American Liquid Gas Corp., 1109 South Santa Fe Ave., Los Angeles, Calif.

Lighting Fixtures—Catalog No. 400 photographically illustrates in eight pages four new "Mitchelite" fluorescent lighting fixtures for both individual and continuous-row lighting, and for surface or suspension mounting; issued by Mitchell Mfg. Co., 2525 N. Clybourn Ave., Chicago.

Pumps—Features of design and construction of vertical axial and mixed-flow pumps designed for pumping large volumes of liquid at comparatively low heads, are shown by 27 illustrations in a 20-page descriptive booklet. Form 7073, published by Ingersoll-Rand Co., 11 Broadway, New York.

V-Belt Drives—"Worthington Sheaves Now Available for Driver and Driven Units," a 16-page booklet giving numerous advantages, standardized dimensions and interchangeable hub and rim combinations for multiple V-belt drives, has been issued by Worthington Pump & Machinery Corp., 426 Harrington Ave., Harrison, N. J.

Vacuum Pumps—Construction features and specifications of three standard-size bellows-type vacuum pumps are given in the 4-page illustrated Bulletin 10, issued by American Automatic Typewriter Co., 614 N. Carpenter St., Chicago.

CONTROL EQUIPMENT

Control Equipment—The Electro-Chemograph, recording polarized dropping mercury electrode equipment for the determination of current-potential relations and quantitative and qualitative analysis, is described in detail in a 15-page Bulletin E-94 (1), published by Leeds & Northrup Co., 4907 Stenton Ave., Philadelphia, Pa.

Control Equipment—Diagrams, capacity tables, list prices and dimensions of self-operated temperature regulators and mixing valves for controlling cooling circuits on internal combustion engines, compressors and condensers, are given in 12-page Bulletin No. 700, published by Sarco Co., Inc., 475 Fifth Ave., New York.

Control Instruments—Bulletin 87-1, a 6-page manual describing in detail the operating principle of the two-unit Brown New-Matic Time Pattern Controller, with diagrams and illustrations of installations, has been published by Brown Instrument Co., Wayne & Roberts Aves., Philadelphia, Pa.

Control Instruments—A condensed 16-page catalog, Bulletin No. Z6200, illustrating temperature-control instruments, portable potentiometers, remote controllers and Flame-otrols, has been published by Wheelco Instrument Co., Harrison & Peoria Sts., Chicago.

MISCELLANEOUS

Automotive Maintenance—The use of "Oakite Penetrant" for such jobs as tank degreasing, steam-detergent cleaning, cooling system maintenance and garage washing, in the maintenance of truck floor fleets, is set forth in a 12-page booklet issued by Oakite Products, Inc., 22 Thames St., New York, N. Y.

Bakery Sanitation—As a means of promoting better sanitation methods in the bakery, a new 40-page comprehensive booklet entitled, "Bakery Sanitation—A manual of Modern Methods," fully illustrates the cleaning of bake ovens, general cleaning operations, disinfecting and deodorizing, metal polishing, stain and mold control and scale removal; issued by Diversey Corp., 53 W. Jackson Blvd., Chicago.

Boiler Water Conditioning—How Elgin deconcentrator systems operate in keeping boilers and boiler water permanently clean is fully described and illustrated in a 16-page booklet, Bulletin 504, entitled "The Inside Story of Boiler Water Conditioning," issued by Elgin Softener Corp., Elgin, Ill.

Freezing Plant Sanitation—Sixty-one principal sanitation problems most frequently encountered in quick freeze and locker plants, together with efficient sanitation technics and maintenance procedure to prolong the life of existing equipment, are given in a 12-page manual published by Oakite Products, Inc., 22 Thames St., New York.

Nickel Alloys—Eight types of nickel alloys used in the manufacture of such equipment as steam-jacketed kettles, pickling baskets and pectin evaporators are described in a 16-page illustrated booklet entitled, "Inco Nickel Alloys for the Process Industries," issued by International Nickel Co., 67 Wall St., New York.

Stoker Maintenance—A 20-page bulletin, "Fundamentals of Stoker Operation and Maintenance," discussing the fundamentals of stoker operation, lubrication, inspection and maintenance, has been published by Combustion Engineering Co., Inc., 200 Madison Ave., New York, N. Y.

Synthetic Rubber—"Crisis in Rubber," is the title of a 14-page booklet, briefly reviewing the history of natural and synthetic rubber, and discussing what has been accomplished to meet the existing rubber shortage; issued by B. F. Goodrich Co., Akron, Ohio.

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Hot Springs Conference

(*Continued from page 61*)

industrialized nations where inadequate local markets and transportation and distribution facilities make it practically impossible for tens of millions of consumers to obtain protective foods in adequate quantity and variety, particularly during certain seasons of the year. In many cases these facilities could be vastly improved merely through the exercise of determination and efficient direction, with relatively small outlay of capital funds or increase in cost. People in the United States frequently fail to realize the lack of sanitation and other desirable features of food handling which prevails in many of the most populous regions of the world. A high consumption of milk, for example, involves much more than merely producing the milk. Equally necessary is an efficient, sanitary system for handling and distributing this perishable product. The Food Conference has set the 44 nations represented along the trail of improvement in such facilities, and this can and will contribute in important measure to the improvement of nutritional standards of people everywhere, and to eventual realization of the goal of "freedom from want" set forth in the Atlantic Charter.

A new emphasis on nutritive values and on protective foods surely is forecast. The public is going to be increasingly "nutrition conscious." That is something that I think our food industries already realize. The canning industry, for example, is now engaged in a painstaking study of the nutritive value of canned foods as affected by all the many factors in production and processing. This is the kind of forward-looking research that will be needed more and more.

To sum up: I believe the food industries would do well to give a great deal of thought to the results of the Conference, which are especially significant to them for three important reasons:

1. The emphasis on greatly increased mass purchasing power the world over means an enormous new market for a better, more varied food supply. If we in the United States can maintain our present level of production and consumption after the war, we will have an overall increase of about 40 percent in the demand for food above 1940, our record prewar year. Not only the staple items but high-class or semi-luxury food products will be in great demand, and there will be ready markets for expanded production. And we are only one country.

2. The emphasis on efficiency and on better nutrition means new opportunities for wide-awake producers who will make full use of research. By the same token, market-finding will be stimulated. It is too early to judge just what will be the place of such comparatively new products as dehydrated vegetables, meats and milk after the war, but conceivably they could be very significant in international trade.

3. The emphasis on greater freedom in international trade means an end, ultimately, of the policy of national self-sufficiency and a better chance to create a continuing demand for what we can produce efficiently and to supply the demand in an orderly fashion.

In general, through improved efficiency, for which the known possibilities are enormous in many areas, through special governmental programs to raise nutritional standards among those most in need—the school lunch and school milk programs, for example—and through expansive policies, the Conference believed substantial and constant progress can be achieved. It is, I think, a sound and reasonable program. It is the freedom-from-want program. In it, everyone, and in particular the food industries, can find new opportunities for contributing to a healthier, more prosperous, and more peaceful world.

Dehydration Costs

(*Continued from page 67*)

applicable to other operating problems.

Certain assumptions must be made and some caution exercised in the use of graphs such as Figs. 8 and 9. For the purpose of these graphs, it is assumed that all changes in weight during preparation, either through loss of material or changes in water content, are included in the preparation loss.

When wooden trays are being used in the determination of preparation loss, errors may be caused by the variable tare weight of the trays, depending on the wetness of the wood. This difficulty can be largely overcome in test runs by wetting the trays before loading and using the weight of the wet trays as the tare weight. The problem is obviated by the use of metal trays.

The changes in weight from the raw material as purchased to the prepared material ready for drying include such items as dirt removed in preliminary washing, culls graded out, the actual preparation losses (peeling, coring, trimming, and so forth) and leaching losses or water pickup during peeling, cutting, washing and blanching. Excessive washing after cutting, and especially after blanching, may result in losses of 10 percent or more on potatoes.

In test runs, the drying ratio should be determined on the *plant* prepared

material, ready to go to the dehydrater, rather than on small samples. (Determination of drying ratios on raw samples of different raw materials is, nevertheless, a valuable means of making preliminary comparisons.)

Inspection losses on the final product are frequently so small that they can be neglected. If inspection losses are large enough to warrant a correction on the yield, this correction can be made by a deduction from the yields shown by the graphs for given values of preparation loss and drying ratio. It may be impossible to determine this in advance of actual plant operations. If fines are removed from the dry product before packaging, they may be either a total loss or may have a market value at a lower price. This will require a further correction to the yield. The simplest procedure is to determine yield after removal of the fines and credit the operations separately with any return obtained from the sale of the fines.

Failure to take account of the many factors tending to decrease the final net packed weight may result in ruinously erroneous conclusions regarding the probable overall weight shrinkage from raw material to final product. Solution of the problem outlined above should, however, be relatively easy in an operating plant, since it can be based on actual operating tests.

A greater danger lies in the assumptions that are likely to be made in planning for a new plant where previous experience is not available on the raw material or process. The only data will be hypothetical figures—moisture content of the raw material and estimated peeling and trimming losses, with, perhaps, allowances for inspection and screening losses. Suppose that a mixture of No. 1 and No. 2 potatoes is being used. The moisture content is found to be 78 percent, corresponding to a drying ratio of 4.3 to 1. The total loss from raw to finished product is assumed to be 25 percent, giving an overall shrinkage of 5.7 to 1. Few people would assume a loss of 39 percent, which would raise the ratio to the 7-to-1 value frequently found in actual operation on raw material of this character. The difference may lie in dirt and cullage losses and leaching losses during preparation or failure to use representative material in determining the moisture content.

The cost of raw material includes the following items: Purchase price, brokers' fees and other costs incidental to purchase, hauling charges, cost of handling and storing prior to delivery to preparation line, salaries and expenses of personnel engaged in raw material purchases, other expenses, including indirect and overhead costs.

Part IIB will be published in September—The Editors.

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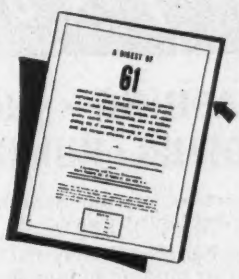
Here are THREE informative Oakite Digests. All are based on the successful experience of both large and small plants the Nation over using Oakite cleaning materials and methods to help assure quality control, conserve man-hours on daily clean-up work, extend life of irreplaceable equipment, and step-up maintenance efficiency.

FISH CANNING DIGEST— Contains 8 pages of data on specialized techniques for keeping all fish processing and handling equipment in sanitary condition easily and quickly . . . tells how to clean over 38 different types of aluminum, galvanized, stainless steel, tinned and Monel equipment safely. All fish canners, processers, filleters and vessel fleet operators should have a copy for reference!

MEAT PACKING DIGEST— Prepared for meat packing and sausage plant superintendents. Concisely reviews from "A" to "Z" widely used, safe methods for handling over 53 essential plant sanitation and equipment maintenance jobs. 17 pages.



QUICK FREEZE & LOCKER PLANT DIGEST— This 12-page Digest gives time-saving tips on 61 different, commonly-recurring sanitation and maintenance tasks. Describes performance-proved procedures for cleaning processing and plant equipment of all types.

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BOOKS

Index to Literature

ENGINEERING INDEX. Published by Engineering Index, Inc., 29 W. 39th St., New York, N. Y., 1943. Price, $50.

Covering all branches of engineering, this index contains 25,000 annotations of important articles published in current technical periodical literature during the year 1942, and there are approximately 40,000 cross-references to these annotations. There is also an author and contributor index. This index is an excellent guide for those who want to make a search for literature published on a technical subject.

Fire Brigade Manual

INDUSTRIAL FIRE BRIGADES. Published by National Fire Protection Association, 60 Batterymarch St., Boston, Mass., 1943. 176 pages; 8½x11 in.; paper. Price, $1.50.

With damage by fire on the increase in American industry, there is need now as never before for organization among plant employees to combat fires. The fire brigade is perhaps the most important part of the fire safety organization, and this manual can be used by management in training such a brigade.

The equipment and methods employed in fighting fires are concisely described and are made easily understandable by extensive use of illustrations. The manual contains chapters on all of the many phases and technics of fighting fires in industrial plants.

Packaging Handbook

PACKAGING CATALOG, 1943. Published by Packaging Catalog Corp., 122 E. 42nd St., New York, N. Y. 633 pages; 9x12 in.; leatherette. Price, $2.50.

Contained between the covers of this large volume is an extensive amount of usable information for those concerned with the packaging of foods and regulations, laws and standards affecting packaging. Of particular timely interest is the first section of the catalog, this covering package planning in wartime. Another outstanding feature of the catalog is a large chart of the properties of functional packaging materials, which lists the general, mechanical, chemical and permanence characteristics of cellulose derivatives, vinyl resins, rubber-base products, wax-base products, paper products, metal foils and metal-foil laminations.

Nearly every type of container, machine and material is discussed, as well as most phases of packaging technic. The discussions are necessarily concise, but they do give a good overall picture of what's what in packaging.

Cold Room Insulation

MINERAL WOOL; LOOSE, GRANULATED OR FELTED FORM, IN LOW-TEMPERATURE INSTALLATIONS. COMMERCIAL STANDARD CS105-43. Published by the U. S. Department of Commerce, 1943. 21 pages; 6x9 in.; paper. Price, 5 cents; for sale by Superintendent of Documents, Washington, D. C.

Users of rock, slag or glass wool for insulating refrigerated rooms in the food industries will find the specifications in this standard of practical value, not only as a guide in buying the material but as an aid in installing it. A table shows the thicknesses to be used for various temperatures, and drawings show in detail how the material is applied to walls, floors, ceilings and pipes.

Vitamin Technology

VITAMINS AND HORMONES. Edited by Robert S. Harris and Kenneth V. Thimann. Published by Academic Press, Inc., 125 E. 23rd St., New York, N. Y., 1943. 452 pages; 6½x9 in.; cloth. Price, $6.50.

This publication is a compilation and digest of current literature on vitamins and hormones, each chapter being written by an investigator who endeavored to evaluate the present status of his special subject and to indicate what knowledge is lacking. Most of the publication is concerned with vitamins, and it will therefore be useful to technologists in the food industries who are studying the chemistry of vitamins and their nutritional value.

Plant Posters

POSTERS FOR PRODUCTION. Published by National Association of Manufacturers, 14 W. 49th St., New York, N. Y., 1943, 36 pages; 11x8½ in.; paper. Free.

This booklet is a compilation of small-scale reproductions of posters for inspiring greater effort on the part of workers. There are 70 of the posters, these having been selected from almost 1,000 submitted by industry for NAM's consideration. In many instances the companies which designed the posters are willing to make the original art work available to other organizations desiring it. None of the posters is from the food industries, but many of them could effectively be used in food plants to boost production, combat absenteeism and increase attention to safety.

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PATENTS

Vegetative Material Dehydrated by Hot Gases of Combustion in Rotatable Drying Drum—Henry C. French, Elm Grove, Wis., to Arnold Dryer Co., Milwaukee, Wis. No. 2,319,673. May 18, 1943.

Rotary Drum Dryer Made to Have Central Tubular Drying Zone Open for Feed of Material at One End and Equipped With Series of Elongated Agitating Flights and With Means for Reducing Pressure in Drying Zone to Below Atmospheric—Henry C. French, Elm Grove, and Harlow L. Schmidt, Milwaukee, Wis., to Heil Co., Milwaukee, Wis. No. 2,319,674. May 18, 1943.

Walnuts and Similar Nuts Cracked in Mechanical Device Designed to Separate Improperly Cracked Nuts From Properly Cracked Ones—Emile N. Vigneau, to Rosenberg Bros. & Co., San Francisco, Calif. No. 2,319,757. May 18, 1943.

Poultry Freed From Feathers by Mechanical Picker—Eddy E. McMahan, Los Angeles, Calif., and Antoine Charlebois, Bellingham, Wash. Reissue 22,323. May 25, 1943.

Yeast in Water Suspension Activated by Addition of Nutrient, Subjected to Dispersion of CO_2 in Solution Under Pressure of From 100 to 150 lb. and Cooled to Between 30 and 50 Deg. F. Preliminary to Increasing Pressure on Solution up to 3,000 Lb. Per Sq. In. and Temperature up to 180 Deg. F., Followed by Discharge of Suspension Into Vacuum Chamber for Separation of Gas and Subsequent Centrifugal Separation Into Supernatant Liquid and Residue Fractions—William P. Torrington, to Emulsions Process Corp., New York, N. Y. No. 2,319,831. May 25, 1943.

Granular Free-flowing Material Coated With Sprayed Liquid During Passage Through Downwardly Converging Cone Unit—Thomas R. James, Minneapolis, Minn., to General Mills, Inc. No. 2,319,865. May 25, 1943.

Foodstuffs Conveyed From Transfer Station to Can-filling Station on Production Line by Endless Belt Carrying Plurality of Molds—William de Back, to Chisholm-Ryder Co., Inc., Niagara Falls, N. Y. No. 2,319,900. May 25, 1943.

Foodstuffs Weighed and Filled Into Containers Under Photoelectric-cell Control—Charles T. Walter, to Industrial Patents Corp., Chicago, Ill. No. 2,319,908. May 25, 1943.

Processed Cheese Packaged in Container With Rubber Hydrochloride Film Lining Which is Heat Sealed by Molten Cheese—James E. Snyder, Akron, Ohio, to Wingfoot Corp., Wilmington, Del. No. 2,319,956. May 25, 1943.

Cottonseed Oil Refined on Continuous Basis for Removal of Gums, Resins and Mucilaginous Content, Neutralization of Free Fatty Acids Content, and Complete Centrifugal Removal of Soap Stock—Ward J. Bloomer, Westfield, and Walter J. Zahniser, Bayonne, N. J., to The Lummus Co., New York, N. Y. No. 2,319,970. May 25, 1943.

Citrus Fruit Juices Extracted and Processed in Heavily Charged Carbon Dioxide Atmosphere and Subsequently Subjected to Vacuum for Removal of Dissolved CO_2—William R. Ketchum, Phoenix, Ariz. No. 2,319,994. May 25, 1943.

Natural Fruit Juices Recovered From Fruit Culls or Cannery Waste in Continuous Straight-run Process—Roy Edward Harris, San Jose, Calif. No. 2,320,036. May 25, 1943.

Doughnuts Moved Through Continuous Forming and Cooking Unit so as to Reverse Its Initial Direction of Travel and Be Discharged Near Forming and Feeding Station—Walter G. Holmes, William R. Coyne and Alexander S. T. Lagaard, to Dough-King, Inc., Minneapolis, Minn. No. 2,320,037. May 25, 1943.

Edible Juice Recovered From Layer of Pineapple Meat Adhering to Pineapple Shell Cut From Fruit Preparatory to Slicing for Canning — Albert Ernest Stanley, to Hawaiian Pineapple Co., Ltd., Honolulu, Hawaii. No. 2,320,054. May 25, 1943.

Flour Bleached by Treatment With Agent Consisting of Sulphur Trioxide and Nitrite of Alkali Metal—Souren Z. Avedikian, Baltimore, Md. No. 2,320,058. May 25, 1943.

Oils Hydrogenated by Aid of Catalyst Consisting of Precipitated Carbonates of Nickel and Copper Prepared by Drying at Not More Than 200 Deg. F., Heating in Inert Liquid in Intimate Contact With Inert Gas at Temperature Ranging From About 300 to About 360 Deg. F. and Reduced With Hydrogen While Maintained at Temperature Between About 300 and 400 Deg. F.—Casimer J. Borkowski, Chicago, and Jacob L. Schille, Berwyn, Ill., to Best Foods, Inc., New York, N. Y. No. 2,320,063. May 25, 1943.

Proteins Recovered by Enzyme Precipitation—Francis C. Atwood, Newtonville, and William Paterek, Brighton, Mass., to Atlantic Research Associates, Inc., Newtonville, Mass. No. 2,320,165. May 25, 1943.

Candies Decorated in Continuous Manner by Mechanical Means—George S. Perkins, Kew Gardens, N. Y., to National Equipment Co., New York, N. Y. No. 2,320,297. May 25, 1943.

Glyceride Fats Heated to High Temperatures in Presence of Small Quantity of Nontoxic, Water Insoluble, Polyvalent Metal Salt of Higher Fatty Acid to Inhibit Foaming—Howard C. Black, to Industrial Patents Corp., Chicago, Ill. No. 2,320,319. May 25, 1943.

Bread Wrapped to Give Package With Tucked-in and Heat-sealed Ends—Thormod Jensen, Laurelton, N. Y., to American Machine & Foundry Co. No. 2,320,362. June 1, 1943.

Icing Mechanically Applied to Pastry on Small Production Scale Basis—John MacManus, Yonkers, N. Y., to Cushman's Sons Inc., New York, N. Y. No. 2,320,529. June 1, 1943.

Substantially Oil-free Coffee Bean Processed to Become Constituent in Molding Compound—Herbert S. Polin, New York, N. Y. No. 2,320,649. June 1, 1943.

Bottled Beverages Mechanically Mixed in Case Batches—Alonzo R. Hite and Joseph N. Hendrix, Mattoon, Ill. No. 2,320,730. June 1, 1943.

Doughnut Dusting Sugar Made to Contain About 0.4 Percent Wax Based on Sugar Weight—John W. Schlegel and Louis Lang, New York, N. Y., to National Sugar Refining Co., Edgewater, N. J. No. 2,320,831. June 1, 1943.

Foods Contained in Flexible, Impervious, Heat-sealed Containers Retorted Without Bursting of Container Walls—Duryea Bensel, to Bensel-Brice Corp., Los Angeles, Calif. No. 2,320,982. June 1, 1943.

Ice Cream Bars and Similar Frozen Confectionery Units Harvested From Forming Device and Packaged Simultaneously Into Plurality of Open Boxes, Each Having Closure Flap—Leo D. Overland, Brooklyn, N. Y., to Joe Lowe Corp., New York, N. Y. No. 2,320,985. June 1, 1943.

Canned Foods Heat-treated While Passing in Continuous Manner Along Helical Channel Attached to Inner Surface of Drum Rotating in Tank Containing Treating Liquid—William de Back, to Chisholm-Ryder Co., Inc., Niagara Falls, N. Y. No. 2,321,016. June 8, 1943.

Fish Filleted by Action of Spaced Rotary Knives Set to Make Narrow V-cut Along Back of Decapitated Fish—William Hutton, Monterey, Calif., to Seapride Packing Corp., Ltd. No. 2,321,086. June 8, 1943.

Egg Meats Freed From Foreign Matter and Chalazae by Forcing Through Filter Unit Under Pressure—Frank B. Lomax, Chicago, Ill. No. 2,321,092. June 8, 1943.

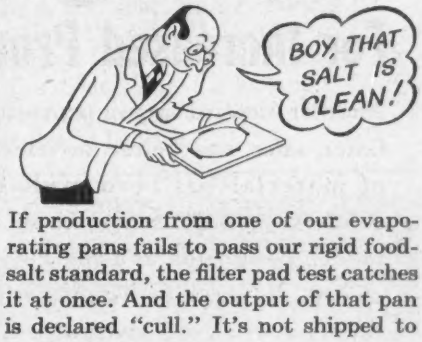
Sirup Supplied to Partially Filled Containers Through Valve Permitting Escape of Air From Container—Clyde D. Russell, Oakland, Calif., to California Packing Corp., San Francisco, Calif. No. 2,321,104. June 8, 1943.

Coffee Berries Processed by Pulping, Fermenting With Yeast and Removal of Mucilaginous Coating by Washing—George William Kirby, Yonkers, William Redmond Johnston, Bronx, and Charles N. Frey, Scarsdale, N. Y., to Standard Brands, Inc.,

Our ears are clean

CLEANLINESS is an acquired characteristic. It doesn't happen by chance. Ever know a small boy to wash his ears willingly? Of course not! That's why kids have to stand inspection every morning before they trudge off to school.

It's the same way in the salt business. We've learned through experience that unceasing vigilance is the price of real cleanliness. That's why Diamond Crystal Salt "stands inspection" constantly. Fact is, in our quality control laboratory, *twelve* times per hour, *twenty-four hours per day*, filter pad tests prove the cleanliness of Diamond Crystal Alberger Salt. That's vigilance!



If production from one of our evaporating pans fails to pass our rigid food-salt standard, the filter pad test catches it at once. And the output of that pan is declared "cull." It's not shipped to food processors.

So you can be sure that every bag, every shipment of Diamond Crystal is *clean*. The insoluble content is so insignificant, it can only be measured in parts-per-million. *Clean to the sixth decimal*—that's Diamond Crystal!

NEED HELP? HERE IT IS!

Without the slightest obligation to you, we'll be happy to advise you about any salt problem you may have, or even send an experienced salt technician to your plant. For this *free* service, write to Technical Director, Diamond Crystal Salt, Dept. J-8, St. Clair, Michigan.

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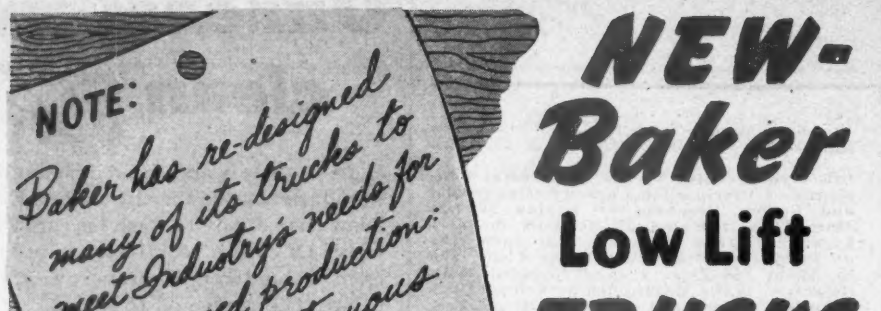
ALBERGER PROCESS SALT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1. Longer continuous operation.
2. Faster handling
3. Lower maintenance.

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For Increased Production and Efficiency

Another forward step in providing faster, safer, and better movement of material has been made by Baker Trucks. This new Low-Lift model, designated as Type E-3, is of 6000 lb. capacity. The improvements consist of hydraulic lift, increased battery capacity permitting longer continuous operation, chamfered front top corner of battery compartment improving driver's visibility, operator's guard integral with frame for greater strength and safety, and other features which provide increased efficiency and easier maintenance ...The new improved design is also available in 4000 lb. capacity (Type E-2). Write for complete information.

NEW Baker Low-Lift Truck has these advantages:

1. Hydraulic lift system proved by experience in other Baker Trucks, providing positive control of hoisting and lowering.
2. Larger battery box (32" x 39½") permitting enough additional battery capacity so that trucks can be operated continuously for longer shifts.
3. Streamlined design of battery compartment providing greater visibility for operator.
4. Sliding type battery cover equipped with handles for faster servicing.
5. Operator's guard built integral with frame for greater strength and safety and improved appearance.
6. Handy compartment for carrying towing chain, pinch bar, or other tools.
7. Controls in a conveniently accessible panel providing easy maintenance.
8. Alloy-steel trailing axle firmly anchored to frame, wheels steering on anti-friction bearings. Box-section frame to withstand strains and minimize maintenance.
9. Single hex nut for adjusting travel brake located where it can be easily reached.
10. Standard Baker-built travel motor, and exclusive Baker Duplex-Compensating Suspension for smoother running and longer life.

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New York, N. Y. No. 2,321,148. June 8, 1943.

Semifrozen Confections Made in Unit of Small Production Capacity Using Circulating Refrigerating Fluid—Kenneth E. Bemis, Oakland, Calif. No. 2,321,173. June 8, 1943.

Liquid Foods Heat Treated to Pasteurizing Temperatures and Conditions Under Control of Thermo-sensitive Switching Device—Raymond E. Olson, Pittsford, N. Y., to Taylor Instrument Cos., Rochester, N. Y. No. 2,321,235. June 8, 1943.

Molasses Used as Vehicle in Vitamin A and D Emulsions—George Henry Lubarsky, New York, N. Y., to Vitamol Co., New York, N. Y. No. 2,321,400. June 8, 1943.

Pears Stemmed by Mechanical Means Without Damage to Fruit—Raymond L. Ewald, Olympia, Wash., to Special Equipment Co., Portland, Ore. No. 2,321,590. June 15, 1943.

Animal Meat Tissue Tenderized by Action of Ficin Under Controlled Time and Temperature Conditions—John M. Ramsbottom, to Industrial Patents Corp., Chicago, Ill. No. 2,321,621. June 15, 1943.

Animal Meat Tissue Tenderized by Action of Bromelin Under Controlled Time and Temperature Conditions—John M. Ramsbottom and Levi S. Paddock, to Industrial Patents Corp., Chicago, Ill. No. 2,321,622. June 15, 1943.

Animal Tissue Treated with Proteolytic Enzyme Capable of Tenderizing Action Under Controlled Time and Temperature Conditions Without Material Disintegration of Tissue—John M. Ramsbottom and Levi S. Paddock, to Industrial Patents Corp., Chicago, Ill. No. 2,321,623. June 15, 1943.

Natural Casings for Sausages Treated with Animal Proteolytic Enzyme to Tenderize Without Substantial Tissue Disintegration—John M. Ramsbottom and Levi S. Paddock, to Industrial Patents Corp., Chicago, Ill. Nos. 2,321,724 and 2,321,625. June 15, 1943.

Flat Cakes Removed From Bake Oven Conveyor to Cooling Receiver by Mechanical Means—Harry G. Tatosian and Robert A. Yohai, New York, N. Y. No. 2,321,634. June 15, 1943.

Whole Milk Packaged in Rectangular Container Constructed to Permit Separation of Cream From Other Milk Constituents During Standing With Subsequent Emptying Out of Either Cream or Milk Through Indicated Openings—Joseph F. Courtney, Chicago, Ill., one-half to Theron L. Hedgpeth, River Forest, Ill. No. 2,321,660. June 15, 1943.

Canadian Patents

Ready-to-eat Cereal Made to Consist of Hulled and Degerminated Maize Grits Enlarged from 15 to 20 Times Normal Size by Puffing—Eugene H. McKay and William P. Penty, Battle Creek, Mich., to Kellogg Co. No. 412,603. May 18, 1943.

Glyceride Fats Mixed With Water and Subjected to High Temperature and Pressure to Give Splitting Into Glycerine and Fatty Acids—Benjamin H. Thurman, Bronxville, N. Y. Nos. 412,683 and 412,684. May 25, 1943.

Milk Dehydrated in Continuous Manner by Subjecting Finely Divided Particles of Milk to Currents of Heated Air—Joseph M. Hall, to Drying and Concentrating Co., Chicago, Ill. No. 412,751. May 25, 1943.

Lager Beer Made by Fermenting Wort at 20 to 24 Deg. R. for 24 to 36 Hours and Given Heat Treatment for 1½ to 2 Hours at 60 Deg. R. for Disruption of Yeast Cells and Elimination of Undesirable Green Beer Constituents—Anton Dolenz, San Francisco, Calif. No. 412,822. June 1, 1943.

Special Baker Flour Made by Mixing Aneurin-containing Concentrate Into White Flour—Albert Green, Chislehurst, Kent, England. No. 412,825. June 1, 1943.

Meat Preserved by Treating Within 4 hours After Slaughter With Hypertonic Saline Solution for 24 Hours, Packing in Hermetically Sealed Container With 20 per-cent Table Oil, and Heat Treating at 75 Deg. C. for Three Successive Days—Joaquin Sanchez Ubeda, Buenos Aires, Argentina. No. 413,007. June 8, 1943.

Questions & Answers

Monosodium Glutamate

Vancouver—"As we are very much interested in the manufacture of monosodium glutamate, we would be greatly obliged for any information regarding the most economical way of extracting gluten from wheat flour in large quantities, also in the processing of glutamic acid."

To the best of our knowledge there is no published information on the manufacture of this product, although there has been some research work done on it at the Western Regional Research Laboratory, Albany, Calif.

While wheat gluten is the richest source of glutamic acid, it is not the most economical raw material with which to start. Only those companies which have a market outlet for wheat starch can afford to separate wheat gluten. In the United States, only two companies are now separating wheat starch and marketing gluten or gluten flours on an industrial scale. The present war conditions, with a heavy market demand for protein-free starches and for wheat gluten or its derivatives, may change that picture.

The equipment necessary to get the gluten from wheat starch includes some kind of a slow-acting mechanical mixer which will permit the formation of a very heavy water and wheat flour dough. The dough should be so heavy that it will form into a mass simulating a ball. When this mass has been formed, through sufficient hydration of the gluten, it is subjected to a very quiet flowing stream of water, in almost any kind of a mechanical device that will permit the gentle and methodical kneading of the dough. The flow of water will then carry away the wheat starch. Starch is collected in a catch basin or settling ripple, such as is used in the separation of cornstarch from zein.

The classical old-time procedure for making glutamic acid or glutamic acid hydrochloride, from which the monosodium glutamate can be made upon neutralization, is to digest the gluten with hydrochloric acid. That procedure is not recommended for industrial application because of the corrosive action of the hydrochloric acid and hydrochloric acid fumes on all types of metal equipment and plant structure.

Only one company in the United States is making monosodium glutamate on a commercial scale at present, so far as we know. Although the production of this plant has been increased manyfold since the outbreak of the war, the present market demand is such that it could sell some five or six times its 1942 production, if it had the production capacity.

This company uses sugar beet steep water concentrate as the raw material, and a dilute alkali hydrolysis method of producing the glutamate. The process is based on patents issued to A. E. Marshall. Details of the operation are not available.

Food Yeast

British Guiana—"Can you give us any information about process of manufacture of 'Torula utilis,' the recently discovered yeast food?"

Torula utilis is one of the so-called false or wild yeasts, incapable of producing spores. Its use as an industrial organism is not new, since it was grown extensively during the war period of 1914 to 1918 as a feed material. Its value lies in the fact that it produces a high-protein food, useful when animal protein is not available.

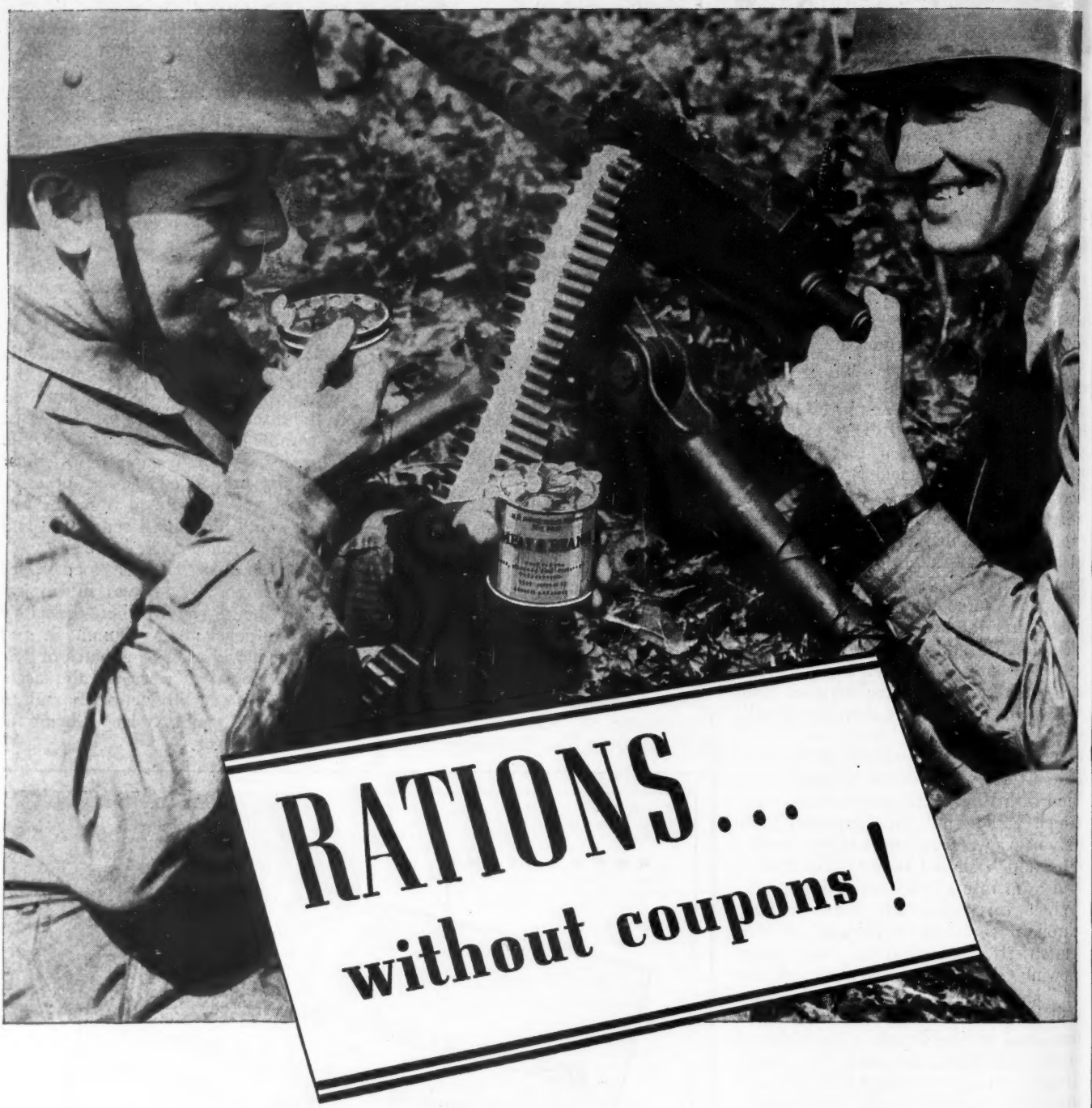
The Chemical Research Laboratory, Department of Scientific and Industrial Research, at Teddington, England, has carried on work with this organism, so that the organism itself and the method of growing it have been improved.

It is claimed that the yeast product, when dry, contains as much as 50 percent of high-grade protein, approaching in nutritive value that of meat and fish, and that the content of vitamin B complex is higher than that of animal protein, including liver. The product has a slightly meaty taste and is of a light straw color.

The yeast is grown under strongly aerobic conditions. A continuous process has been developed. Waste molasses, with the necessary ammonia and phosphate, is used to grow the organism. A stream of air is admitted to the cylinder. The suspension of yeast is withdrawn from one end of the cylinder and fresh supplies of sugar and salts are added at the other.

The yeast is separated from the suspension in a high-speed centrifugal and dried on a roller drier.

It is expected that this "food yeast" will be important for use in tropical and subtropical regions where the native diets are deficient in vitamin B, and also that it will provide a source of protein for postwar feeding in the occupied countries. Production is said to be cheap and rapid. A plant is being installed in Jamaica.



The men at the front never saw a ration book . . . nor counted any points . . . but the food they eat is as typically American as anything on sale at the corner store.

It's packed here in the United States in standard size containers that range in size from the individual "Iron Ration" all the way up to cans that will feed a whole platoon . . . and the Quartermaster Corps is as particular about the quality of the container as they are about what goes into it!

That's why everyone at Crown puts a little extra effort into seeing that the Crown Cans headed for the fighting fronts are as perfect as modern machinery and human skill can make them!

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CROWN CAN

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

VITAMINS

Carotene Fortification

LEAFY-GREEN plants, such as alfalfa, yield an unsaponifiable concentrate containing vitamin E and other antioxidants, together with the carotene. In accelerated aging tests at 113 and 140 deg. F., carotene added as alfalfa concentrate was protected in mineral oil, which contains no antioxidants. Without added antioxidants, crystalline carotene remained quite stable for 230 hours at 113 deg. F., then underwent almost complete decomposition in the next 50 hours; with 0.1 percent hydroquinone, the best antioxidant used, 88 percent remained after 476 hours; while 89 percent of the carotene added as alfalfa concentrate remained after 865 hours. Vegetable oils and hydrogenated vegetable shortenings contain enough antioxidants to protect added crystalline carotene. Hydrogenated vegetable shortening retained 90 percent of the added carotene after 6,060 hours at room temperature, oleomargarine 50 percent. At 46 deg. F. the retention for oleomargarine was 80 percent. Lard retained 30 percent of the carotene added as crystalline carotene and 67 percent from the alfalfa concentrate, with 80 percent remaining after the test at 46 deg.

White flour, solvent-extracted soybean meal and expeller-extracted soybean meal were enriched to 60,000 I.U. of vitamin A per pound. Solvent-extracted soybean meal showed the best retention, then white flour and expeller-extracted soybean meal. After more than 250 days at room temperature the figures for alfalfa concentrate were 90 percent, 77 percent and 34 percent, respectively, of the carotene originally added.

Commercial carotenized solvent-extracted soybean flour gave better results with the alfalfa concentrate than with carotene-in-oil, retention being improved in both cases by the addition of soybean lecithin. After 226 days at room temperature, the sample enriched with alfalfa concentrate with 2.5 percent technical grade soybean lecithin added contained 94.5 percent of its original carotene. The alfalfa concentrate showed 91.3 percent. Carotene added as carotene-in-oil was retained 83 percent when soybean lecithin had been added, and 75 percent without.

The authors call attention to the fact that crystalline carotene must not have been exposed to air for any appreciable time before it is used in stability tests, as it oxidizes rapidly. The rate of decomposition in mineral oil at 113 deg. F. can be used to ensure suitability for stability tests, since carotene which has been exposed to air will decompose in as little as 24 hours, whereas 300 hours is required for crystalline carotene from freshly opened vials.

Digest from "Fortification of Oil, Fat, and Flour. Stability of Added Carotene and Effect of Antioxidants," by P. W. Morgal, L. W. Byers and E. J. Miller, *Industrial and Engineering Chemistry*, vol. 35, 794-97, July, 1943.

BACTERIOLOGY

Improved Media for Thermoduric Bacteria

CONDITIONS satisfactory for the growth of unheated bacteria are not equally satisfactory for enumeration of organisms which have been subjected to heat treatments of sublethal intensity. This is of importance in the examination of heat-processed products such as pasteurized milk.

Pure cultures on four common media showed that beef-infusion agar usually gave higher counts of surviving heat-treated organisms, including *Bacillus subtilis* and the thermoduric lactic streptococci, *S. liquefaciens*, *S. zymogenes* and *S. durans*. The new standard milk agar gave results of approximately the same magnitude. Nutrient agar proved superior for *Staphylococcus aureus*, but inconsistent results were obtained with this organism. Synthetic agar gave inconsistent results throughout.

There are indications that factors other than the gross chemical composition must be considered in determining the effect of various media on the initiation of growth by heat-treated bacteria.

Digest from "Factors Which Influence the Growth of Heat-Treated Bacteria, I. A Comparison of Four Agar Media," by F. E. Nelson, *Journal of Bacteriology*, vol. 45, 395–403, April, 1943.

The Microbacterium

ORGANISMS belonging to the genus Microbacterium contribute materially to high thermoduric plate counts of milk. They gain entrance to the milk supply through dairy farm milking equipment. Cultures for these studies were obtained from such equipment.

On tryptone glucose skim milk meat extract, 3 days at 86 deg. F. is required for incubation, since many colonies are not visible or are easily overlooked after 2 days.

The cultures were weak acid formers, producing principally lactic acid in milk. Representative cultures survived 144.5 deg. F. for 30 minutes, and all but one of ten withstood 160.9 deg. F. for 30 minutes. All but one culture also survived 2½ minutes and seven survived 10 minutes at 185 deg. F., but non survived 30 minutes at that temperature. This high heat resistance indicates that once the organisms have gained entrance into the milk, they will survive pasteurization temperatures usual for market milk and cooking temperatures for cheese. They are not pathogenic.

The organisms are characterized as short, gram positive, nonmotile, nonsporulating, diptheroid-like rods which form catalase, produce lactic acid in milk, fail to liquefy gelatine, and usually fail to produce nitrite from nitrate. Two well-defined species, *M. lacticum* and *M. flavum* are recognized.

Digest from "A Study of the Genus Microbacterium," by M. L. Speck, *Journal of Dairy Science*, vol. 26, 533-43, June, 1943.

FRUIT PRODUCTS

Fruit Juice Blends

EXTRACTION of juice from small fruits, such as strawberries, raspberries, dewberries, blackberries and elderberries, is not satisfactory in the usual screening devices. In the course of experiments to develop palatable and salable fruit juice blends, it was found that improvement in the juice was obtained when the fruit, with 10 percent added sugar, was frozen at − 18 deg. F. and pressed after thawing. The fruit must be thawed slowly, preferably by standing in a warm room. If heat is used, as in a steam-jacketed kettle, the fruit must be warmed so slowly that it is not softened. Yields of 65 to 75 percent were obtained in the hydraulic press, using ordinary press cloths. Juices so obtained deteriorate in storage even when promptly deaerated, flash pasteurized and bottled.

It was found that if the frozen and thawed fruit was pressed cold, then the pomace extracted at 145 deg. F. with apple juice and repressed, the resulting blend could be used with tart apple juice to make a satisfactory beverage.

Strawberries do not yield their full flavor when pressed after thawing, but by thawing the frozen berries in apple juice at 180 deg. F., then pressing slowly, a juice is obtained which has good color and flavor when pasteurized at 185 deg. F. and bottled immediately.

Digest from "Preparation and Preservation of Juices from Certain Small Fruits," by C. S. Pederson and H. G. Beattie, *The Fruit Products Journal*, vol. 22, 260-64, 281, 287, May, 1943.

FATS AND OILS

Autoxidation of Fats

DURING autoxidation, vegetable fats, in which tocopherols occur naturally, form both tocoquinones and chroman-5,6-quinones, while animal fats containing added tocopherol produce only tocoquinones. The chroman-5,6-quinones are fat antioxidants, tocoquinones are not.

When animal fats with tocopherol added undergo oxidation, the end of the induction period corresponds to the disappearance of the tocopherol. As long as tocopherol is present, peroxides do not accumulate in sufficient amount to cause formation of the secondary products which characterize rancidity.

When vegetable fats undergo autoxidation, the tocopherol disappears in the same way, with corresponding formation of tocoquinone, but the disappearance of tocopherol does not correspond with a sharply defined induction period. Spectrophotometric methods show that chroman-5,6-quinones which are formed at the same time as the tocoquinones are oxidized more slowly than the tocopherols, and an abrupt rise in peroxide values does not occur until the concentration of these antioxygenic o-quinones is reduced. In one case hydrogenated cottonseed oil showed organoleptic rancidity in 25 days, and the tocopherols had disappeared before the 35th day, but concentration of the chroman-5,6-quinones did not begin to diminish until about the 45th day and rapid peroxide formation set in after 50 days.

There is an optimum concentration of tocopherols for stabilizing any fat, its value depending on variables such as the presence of other natural inhibitors. The rate of oxidation of tocopherol increases with increasing initial concentration, although the time necessary for oxidation of any given fraction is independent of the initial concentration. The rate of peroxide formation also increases with the amounts of tocopherol present at the beginning of the induction period. With further addition of tocopherol it is possible to reach a concentration where stability of the fat will decrease from the point of maximum effectiveness of the antioxidant.

Digest from "The Autoxidative Behavior of Vegetable and Animal Fats," by C. Columbic, *Oil & Soap*, vol. 20, 105–7, June, 1943.

DAIRY PRODUCTS

Carotenoid Stability In Frozen Cream

CREAM with 45 to 60 percent fat was gathered monthly during one year and subjected to various pasteurizing and homogenizing treatments, then tested fresh and after storage at 0 deg. and -10 deg. F. for periods of 6 to 12 months. None of the factors investigated—pasteurization temperature, homogenization, addition of sucrose, addition of 1 p.p.m. of copper, type of container and storage temperature—had any appreciable effect upon the carotenoid content. The relatively high levels of carotenoids present in the cream during the summer months did not stabilize the cream against the development of copper-induced oxidized flavor when the copper was added after pasteurization.

Digest from "Influence of Several Factors Upon the Amount and Stability of Carotenoids in Frozen Cream and Its Relationship to the Metal-Induced Oxidized Flavor," by G. M. Trout, L. A. Moore and M. V. Scheid, *Journal of Dairy Science*, vol. 26, 495-504, June, 1943.

Cooked Flavor

HOMOGENIZATION before pasteurization reduces the likelihood of cooked flavor in commercial market milk pasteurized by the holder method at temperatures up to 150 deg. F. This is the conclusion from a series of tests over a period of ten months on the product of eight different dairies. In tests of 245 samples homogenized before pasteurizing at 143 to 150 deg. F., less than 2 percent showed cooked flavor, while in a comparable series of tests on samples pasteurized and then homogenized, between 3 and 4 percent showed cooked flavor.

Digest from "The Relationship Between the Temperature of Pasteurization (Holding Method) and the Appearance of Cooked Flavor in Homogenized Milk," by B. Spur, *Journal of Milk Technology*, vol. 6, 86–88, March–April, 1943.

Control Tests

FOLLOWING adoption of tryptone-glucose-extract-milk agar as standard for milk control, the Louisville and Jefferson County Health Department during a period of one year plated milk control samples from the same dilution

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bottle on both the old standard and the new standard agar. Tests included all routine pasteurized milk, cream and chocolate-milk samples.

Counts were higher on the new standard agar where thermoduric bacteria were present. Generally, organisms which appeared as "pin-point" colonies on the old standard produced colonies several millimeters in diameter or larger on the new standard agar. In nearly 20 percent of the samples studied the count increased five times or more as compared with the old standard agar.

It was possible to trace thermoduric bacteria to the raw milk supply and to eliminate sources of contamination in many cases.

Digest from "Irregularities in the Agar Plate Counts of Pasteurized Market Milk," by W. L. Williams, *Journal of Milk Technology*, vol. 6, 133–35, May-June, 1943.

QUALITY CONTROL

Dried Whole Egg Powder

STUDIES on high-quality dried egg powder indicate that moisture content, bacterial count, and either fluorescence measurement or potassium chloride value contribute necessary information for control of quality.

Bacterial counts yield information on the general condition of the liquid eggs and the powder produced. Proteose-peptone tryptone agar was used as a plating medium.

Moisture should be as low as is compatible with high quality in other respects. It was here determined as total volatile loss at 100 deg. C. for 12 to 16 hours, or overnight.

Fluorescence and potassium chloride value were found more sensitive to minor differences in quality and were more closely associated with palatability than were other methods of test studied. Fluorescence was measured with a Coleman photofluorometer on egg powder defatted by extraction with chloroform and shaken with 10 percent potassium chloride.

The potassium chloride value takes into account possible protein-lipoid associations. The sample was shaken for an hour with 10 percent KCl, filtered, and the filtrate coagulated on a hot plate, the coagulum being dried at 116 deg. C. for 16 hours. This method can be used in the absence of a fluorometer. On fresh powder this test gives results higher than theoretical, indicating some combination of lipoid and protein in the natural yolk which carries the fat through the filter paper. Processing and storage treatments which alter this complex result in low values.

Beating value and pH gave less clear correlation with quality.

Palatability tests did not detect small

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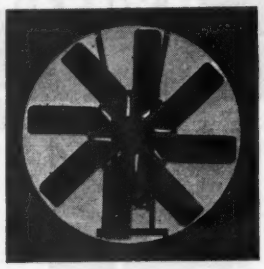

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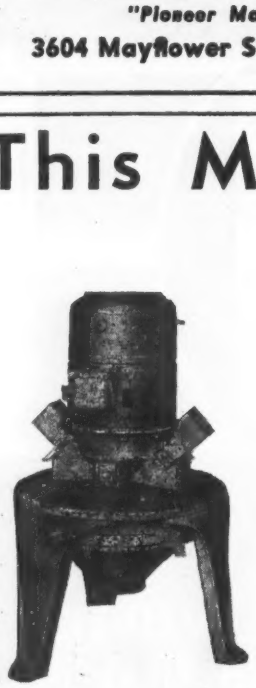

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variations in plant practice in the range of high-quality products, although these variations were clearly indicated by fluorometric results.

Digest from "Dried Whole Egg Powder, I. Methods of Assessing Quality," by M. W. Thistle, J. A. Pearce and N. E. Gibbons, *Canadian Journal of Research*, vol. D, 21, 1-7, January, 1943, and issued as National Research Council of Canada paper No. 1097 (published in Canada).

MISCELLANEOUS

Loss of Coffee Aroma

STALING of coffee appears to be due to volatile compounds or compounds formed in the vapor phase. Samples staled by sealing with oxygen can be restored to comparative freshness by sweeping with nitrogen, although there is a limit to the extent to which coffee can be allowed to accumulate oxidized products and still be restored to freshness. Samples reported very stale after 19 days under one atmosphere of oxygen were slightly stale or comparatively fresh after being swept for 7 days with nitrogen, but a sample held 32 days was reported stale before and after the nitrogen treatment.

Preliminary tests had demonstrated that samples swept with dry or moist nitrogen, oxygen-free, were comparatively fresh after 55 days, and control samples sealed in glass under vacuum were fresh. When swept with dry or moist oxygen, the samples were comparatively fresh after 12 days and slightly stale when tested after 20 days. (Longer test periods are not reported.) The results with moist oxygen are irregular.

Moisture without opportunity for aroma evaporation has a deleterious effect, even in the absence of oxygen. With 2.6 percent added water the flavor of vacuum-sealed coffee was not impaired in 12 days, but as little as 0.9 percent had a noticeable effect in 39 days.

Sealing with oxygen, without opportunity for aroma escape, gave staling, accentuated when moisture was present. Oxygen at atmospheric pressure, without added water, produced stale coffee in 24 days, while under an 18-in. vacuum the coffee was fresh. After 20 days, with oxygen reduced to an 18-in. vacuum, 2.6 percent added water caused a stale flavor.

For the storage intervals involved in ordinary trade channels, the initial partial pressure of oxygen must be reduced substantially below a 29-in. initial vacuum to prevent the appearance of detectable stale flavor by the time the coffee reaches the consumer.

Digest from "Staling vs. Rancidity in Roasted Coffee," by A. C. Shuman and L. W. Elder, Jr., *Industrial and Engineering Chemistry*, vol. 35, 778-81, July, 1943.

Letters to the Editor

Edible Wetting Agent

To the Editor
of FOOD INDUSTRIES:

Some experiments which I made in 1937 on dried prunes, and repeated last year on dried apricots, indicate that wetting agents have no appreciable effect upon the rate of reconstitution of these dried fruits.

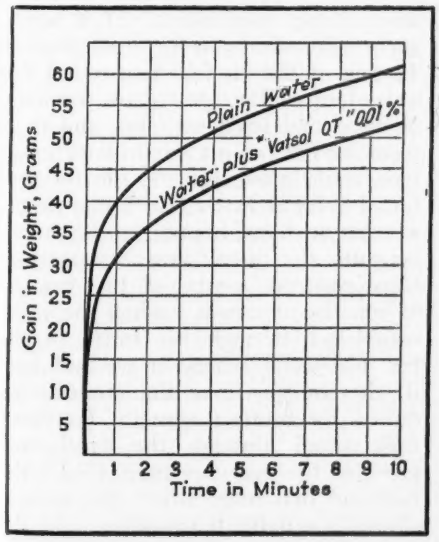
A wetting agent speeds up the all-over wetting of the fruit, it reduces very drastically the film thickness of clinging surface water, but has no noticeable effect upon the rate of penetration of water into the body of the fruit. It is this latter factor which determines the rate of reconstitution, and if, as my experiments indicate, the diffusion of water into the body of the fruit is unaffected by a wetting agent, then there is no particular need for an *edible* wetting agent in conjunction with reconstitution.

There may be a need for such a product on compressed dehydrated food, which is relatively porous, but that remains to be tested.

There follows an informal report on this subject prepared by Ed. James, my assistant.—T. A. SCHWARZ, *chief chemist, California Prune and Apricot Growers Association, San Jose, Calif.*

Wetting Agent Studies

Studies undertaken to determine the suitability and special advantages of a wetting agent in the washing of dried fruit revealed many interesting facts concerning the hydration of fruit during the washing process, confirming much of the data previously obtained by Schwarz. From the experimental data it is obvious that the major part of the moisture taken up during the washing process lies in a thin layer on the surface while only a small portion penetrates into the body of the fruit. The final moisture content, then, is a function of the thickness of this thin surface film since it limits the amount of available moisture after washing. The thickness of this film depends almost entirely upon the surface tension of the fluid of which it is composed.



Rate of moisture uptake of dried apricots by immersion in plain and wetted water.

Experimental Procedure. The testing apparatus consisted of a basket attached to one arm of a platform balance. The balance was clamped onto a ring stand so that the basket containing the dried fruit could be raised and lowered. The fruit was dipped for definite intervals in the test water and then raised for the weighing. The weighings were taken, as nearly as possible, 45 seconds after removal of the basket from the water.

Discussion. A graph of the experimental findings in the determination of the rate of moisture uptake of dried fruit in test solutions of "Vatsol OT," "Vatsol K" and water alone indicate that the wetting agents diminish the surface film although the rate of passage of moisture into the fruit was almost unaffected. In the case of Vatsol OT the film was cut down 20 percent as compared to water, this being the approximate amount by which the surface tension of water is decreased by the addition of 10 percent Vatsol OT in proportions of 1 to 1,000 to water.

The advantage of the wetting agents with respect to the surface film thickness lies in the decrease of total moisture uptake as a result of the washing process. Since the surface film, and hence the amount of moisture uptake for a given length of washing time, is diminished, the actual washing time may be extended without increasing the moisture content of the final product. With this longer washing time, it would naturally be expected that the efficiency of the washing process increase.

The wetting agents may also be used to advantage in the presoaking of dried fruit before they enter the washer. Samples presoaked for one and two minutes gained only slightly more moisture than the sample soaked in water alone for the same time.

The samples in this case were presoaked in the wetting-agent solution for one and two minutes, respectively, and then allowed to gain moisture in water. The comparison of the water curve to those of the wetting agent shows that there is little difference in moisture gain for times up to about 5 minutes.

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How To Compress Foods

(Continued from page 65)

test data: A 2½x1⅜x6¾-in. block of compressed, diced carrots cooled at the center from 140 to 90 deg. F. in 3 hours, with air at 80 deg. F. The block was cellophane wrapped, confined in a holding press, exposing the narrow sides and ends only. Removed at 90 deg. F., it held its shape.

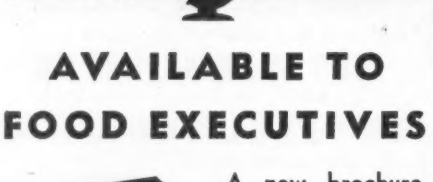
Two-pound blocks of diced carrots were formed in a mold 6⅛x4⅜ in. of a suitable depth. The conditions were 160 deg. F., 1,200 lb. per square inch and a 30-second period at that pressure. The blocks were removed, wrapped in paper and cellophane and sealed. After compression the dimensions over the wrapping were 6⅛x4½x2⅜ in. The expansion in a direction perpendicular to the movement of the ram was $\frac{5}{32}$ in. on a 6½-in. length, allowing for the thicknesses of paper and cellophane. The immediate expansion parallel to the movement of the ram was ⅜ to ½ in. An additional expansion resulted before it was stopped by the wrap and by air cooling. Holding presses prevent the latter expansion.

Actual practice will be a compromise between the goal of most desirable density, on the one hand, and, on the other, the obtainable equipment and its economic adaptation to use.

Blocks should be wrapped and sealed at once in kraft paper or cellophane. If the packing case is large enough to permit slight swelling of the blocks, they may be packed, but if very close adherence to the dimensions of the mold is required, the blocks must be cooled under light pressure part way to room temperature.

If compression is carried out with the wrapper inserted in the mold, complete cohesion of the block is not required. With this latter method of compression and wrapping, the wrapper must maintain its integrity as a moisture-vapor resistant sheet without tears, pinholes or other breaks.

The use of holding presses for the purpose of fixing the shape and dimensions of tobacco plugs and blocks of dried hops, catnip and sage is well known. The time required for tobacco is 5 days; for hops, 12 hours. Such holding presses are not heavy or expensive, because little pressure is used. In one form a hardwood frame of rectangular shape is used. It has a solid bottom end and a loose top end. Plugs are stacked in it nearly to the top; the loaded frame is placed under a small screw press, the top pressed down, wedges are inserted above the top and against the top of the frame, and then the pressure is released and the loaded frame is removed. This type of press, with spaced blocks for ventilation, is one suggested way to cool under pressure.



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Ways To Beat Bacteria

(Continued from page 74)

growth by assembling the homogenizer only a short time before it is to be used, and it should be flushed with very hot water just before milk enters it. Another point to watch is the packing, for if this becomes contaminated it may prove to be a small but constant source of contamination. Long, continuous use of the homogenizer may permit thermophiles to build up their numbers.

The operator is faced with several problems at the drying step, depending on the type of dryer used. The atmospheric drum or roller dryer and the spray dryer are the most common types. The atmospheric roller dryer, from the bacteriological viewpoint, offers fewer problems. The relatively high temperature reached by the milk on the heated roller surface has a marked germicidal effect, as does the simultaneous dehydration. The dried milk is practically sterile as it is scraped off the rolls. It must be remembered that when milk is teeming with bacteria, roller drying does not remove these bacteria, it merely kills them, and the dead bacterial cells remain in the dried milk.

The spray dryer does not reach as high a temperature. In fact, the lactalbumin is not coagulated, so it is likely that the protoplasm of the bacteria is not coagulated. Consequently it is unlikely that the bacteria are killed by the temperature. Instead, dehydration is probably the more effective bactericidal factor in this type of dryer. Based on purely theoretical grounds, it may be predicted that fewer bacteria will be killed with the spray dryer than with the roller dryer, and actual experience confirms the theory. In addition to its less germidical effect, the spray dryer presents other problems, one of which is the large volume of air that necessarily passes through it.

As an example, daily samples of spray-dried milk from a certain plant showed a sudden increase in bacteria and molds. These high counts were found to be correlated with a poorly functioning air filter. The air was carrying big loads of bacteria and molds into the dryer. As this happened in the dry, windy and dusty part of the summer, the results naturally were worse, but sometimes too much is expected of the air filters and they are overloaded. Consider the plant where a cinder, dirt or gravel driveway passes close to the air intake, where the air intake faces in the same direction as the prevailing winds of summer, or the plant with a cultivated field just across the fence from the spray dryer.

Another operator had an annoying and baffling problem presented by the sporadic occurrence of a very undesirable type of bacteria in his spray-dried milk. Repeated laboratory tests had shown that bacteria of this type were coming into the plant in the raw milk, in small numbers. It was found that the heat treatment received by the milk during processing apparently destroyed this particular type of bacteria before it reached the spray dryer, yet it would appear sporadically in the dried product. Testing of the air failed to reveal this as its source. The spray dryer was built of wood and lined with tin, and there seemed to be no pockets in which bacteria could grow. Finally, the foreman found a break in the tin lining of the wooden discharge hopper, and the wood beneath the break was watersoaked. Here was the source of the trouble. When the dryer was washed the water would get through the break in the tin, the wood soaked it up and held it, thereby providing the moisture required for bacterial growth. Powdered milk sifted through the break and provided the necessary food. Under the floor of the spray dryer the hopper offered a suitable temperature, and the unusual location of the broken lining gave the bacteria ample time in which

to grow before the break was discovered and repaired.

The final step after drying is packing. Since the dried milk will not support bacterial growth, contamination is the chief problem. This can come from several sources, such as dirty filling machinery, unclean containers, contamination by the packing personnel, rodent contamination and air-borne bacteria and molds. Fortunately, most of these are rather obvious, and are easily controlled by preventive measures and by good housekeeping.

It is assumed that efficient and diligent application of soap, elbow grease and steam to the entire processing equipment is made daily and that where desirable or necessary such germicidal agents as hypochlorites have been used. For it would seem self-evident that an operator using unclean equipment in an unsanitary plant is coming to bat with two strikes against him.

Manual of Detergents

(*Continued from page 72*)

Cleanser W, Rex No. 372-2 Dairy Cleanser, Magnus IDX, Natos Briquets, Wyandotte GLX, Wyandotte C. W., Solvay Cleanser No. 600, B-K General Cleanser.

Explanation of Abrasives

Some of the old fashioned "scrub and scour" cleaners are still available to those who have plant conditions necessitating this type of product.

This class of cleaning compounds consists of abrasive substances such as volcanic ash or pumicite, either alone or in combination with other cleaning compounds. Many other abrasives, such as feldspar and silica flour, are also used in abrasive scouring powders. These products are very effective but should always be used with care.

Abrasives are especially useful upon stainless steel surfaces in maintaining luster. Fineness of abrasive particles is important to avoid scratching. Scouring powders compounded with wetting agents are superior to those containing soap, as with the latter type complete rinsing of all fine abrasive particles is difficult, if not practically impossible.

As mechanical substitutes, copper or steel wool or filings have also been used alone or with the various types of dairy cleaners. Their cleaning action depends upon scouring action, and because of their scratching and polishing properties they are not recommended for cleaning dairy equipment, especially tinned surfaces.

EXAMPLES: *Old Dutch Cleanser, Wyandotte Detergent, Magnus Surfex, Solvay Super Detergent, Chore Boy, Steel Wool.*

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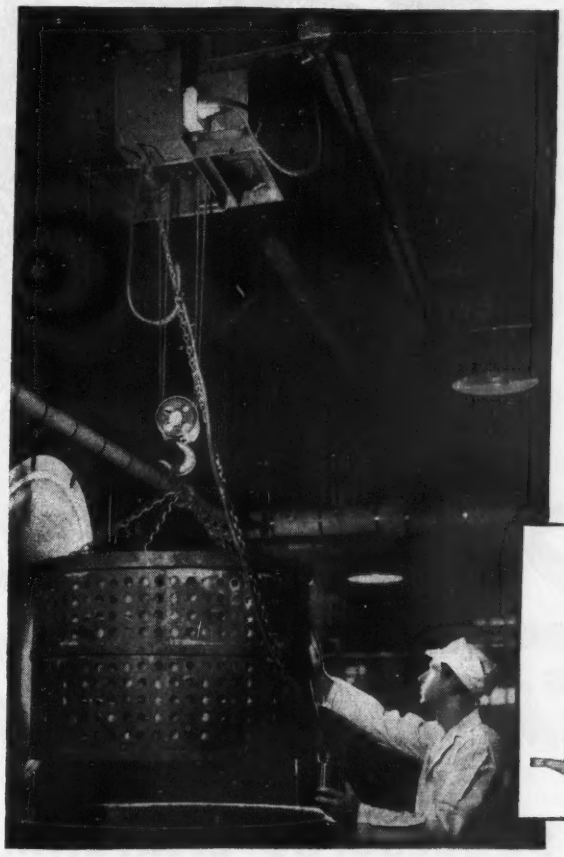

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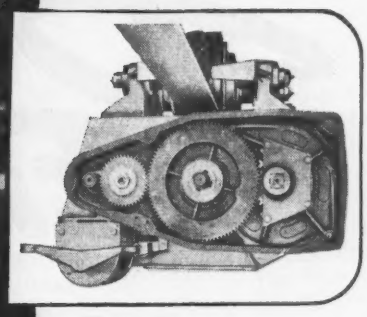

Are you looking for a practical, experience-proved method of saving manpower and lowering your handling costs? Then why not follow the example of leading food producers by installing R & M Electric Hoists wherever there's heavy lifting or conveying to be done?

These hoists are built for *hard work* —around the clock and around the calendar. They're fast, efficient, and require little maintenance because they're precision-built from track to hook, because they're powered by famous R & M motors, because they're perfectly balanced, and because they're equipped with an oversize oil-cooled automatic load brake.

Whether you require capacities of 1000 or 15,000 lbs., there's an R & M Hoist *tailor-made* for the job—and it can be equipped with special trolleys to fit any type of monorail.

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Dunkley Co.....Kalamazoo, Mich.
Chisholm-Ryder Co.....Niagara Falls
James Q. Leavitt Co.....Ogden, Utah
Robert W. Taylor Co.....San Francisco, Cal.
Sprague-Sells Division, Food Machinery Corp., Hoopeston, Ill.

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THE ADVANTAGES of "*VEXTRAM*"—new flour-enrichment mixture which millers are now finding so successful in large-scale production—reflect our long, active experience in handling many enrichment problems.

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Why not take advantage of the long and varied experience these and related products represent? We invite you to consult our TECHNICAL SALES SERVICE at any time, for help with your enrichment problems. No cost or obligation, of course. To get latest, low prices and a *free* copy of the interesting booklet, "*Quick Facts about Enriched Bread,*" write TODAY.

Winthrop's Vitamins and Minerals for food-fortification:

"CRYSTALLINE B_1 WINTHROP"	"VEXTRAM"
"CRYSTALLINE VITAMIN C"	NIACIN
"B-E-T-S"	CALCIUM PANTOTHENATE
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ADDRESS INQUIRIES TO—

Special Markets Division

WINTHROP CHEMICAL COMPANY, INC.

170 VARICK STREET, NEW YORK, N. Y.

FORMULAS FOR FOODS

FORMULA NO. 418

Bologna with Soya Flour

Beef trimmings or bull meat	75 lb.
Regular pork trimmings*	75 lb.
Pork blade fat, cured	12 lb.
Nitrite	⅜ oz.
Salt	4 lb. 8 oz.
White pepper	10 oz.
Coriander	3 oz.
Sugar	10 oz.
Ground celery seed	1 oz.
Nutmeg	3 oz.
Soya flour	6 to 9 lb.
Ice	as required

* This may be one-half pork cheeks and one-half regular pork trimmings if desired.

Quick Cure

Run the beef or bull meat through a No. 1 plate and then chop to a stiff dough, adding the pork trimmings just before the beef is finished. Mix in the nitrite, which should be dissolved in 1 pint of water, and the salt. Allow this to remain overnight in a box truck.

When the meat is placed in the chopper the following morning, add the spices and the soya flour. Finish by adding the 12 lb. of pork blade fat cut into cubes. Ham or back fat will do, but either must be cured. Soya flour must never be added before the meat is cured.

For bologna, the dough should be fairly stiff. Care must be taken not to burn the meat in the chopper.

Stuff and hang in workroom two hours before placing in smoke house.

Due to the great gain with soya flour, it is advisable to increase the spice mixture 10 to 15 percent for best results.

Formula from Stein, Hall Mfg. Co.

FORMULA NO. 419

Crown Gingerbread

Sugar	3 lb.
Shortening	3 lb. 8 oz.
Salt	2½ oz.
Whole eggs	3 lb. 8 oz.
Treacle	10 lb.
Standardized invert sugar	1 lb.
Liquid milk	6 lb.
Flour	10 lb.
Soda	3½ oz.
Ginger	4½ oz.
Cinnamon	1½ oz.

Directions

Cream the sugar, shortening and salt until smooth, then add the whole eggs slowly, and again cream until smooth. Add the treacle, which should have a thick, heavy body. Dissolve the invert sugar in the milk, and also blend the flour, soda, ginger and cinnamon, then add these two mixtures to the shortening, eggs and sugar, and mix until uniform.

Bake at about 360 deg. F.

This should give a large volume gingerbread, with fine and uniform grain, for loaves, gingerbread forms and small units.

Formula from The Nulomoline Co.

FORMULA NO. 420

Raisin Rum Cookies

Granulated sugar	1 lb. 8 oz.
Shortening	1 lb.
Soda	2½ oz.
Salt	1½ oz.
Cinnamon	¾ oz.
Ginger	½ oz.
Cloves	¼ oz.
Rum flavor	½ oz.
Molasses	3 lb.
Water	1 lb.
Pastry flour	5 lb 8 oz.
Cream of tartar	1 oz.
Midget raisins	1 lb.

Directions

Mix 1 lb. of sugar with the shortening, soda, spices and flavor. Mix the molasses and water and add to the first mixture. Sift flour, cream of tartar and the remaining sugar (8 oz.), add the raisins to this and then mix all together. Bake at 400 deg. F. on greased and dusted pans.

Formula from Swift & Co.

FORMULA NO. 421

Oat Bread

Sponge	
Clear flour	60 lb.
Water	36 lb.
Yeast	1 lb. 8 oz.
Medium diastatic malt	8 oz.
Dough	
Clear flour	40 lb.
Water	34 lb.
Yeast	8 oz.
Salt	2 lb. 8 oz.
Milk, solids basis	6 lb.
Treacle	14 lb.
Oatmeal, very fine ground	30 lb.
Shortening	4 lb.

Directions—Sponge Process

Suspend the yeast in part of the water allowed for the sponge. Dissolve the diastatic malt in another portion of the water, then add this solution and the yeast suspension to the rest of the water, together with 60 lb. of flour. Mix 5 minutes at 60 r.p.m., having the materials at 76 deg. F. The consistency should be soft. The dough must be smooth but not fully developed.

To prepare the dough, suspend the 8 oz. of yeast in part of the water. Add the treacle, salt and milk and the sponge to the remaining water, with about one-third of the flour, then add the yeast suspension. Mix until smooth. Add the remainder of the flour and oatmeal, followed by the shortening. Mixing time should be 8 minutes at 60 r.p.m., and the temperature 78 to 80 deg. F. The dough should be medium soft.

Allow to rise 15 to 30 minutes.

The oatmeal used must be very fine ground, as this eliminates the lengthy presoaking period.

Formula from The Nulomoline Co.

FORMULA NO. 422

Ice Cream Bar Coating

Cocoa	1 lb.
Dry milk solids*	2 lb.
Powdered sugar	3 lb.
Butter	7 lb.

* Not over 1½ percent fat.

Mixing

Mix the cocoa, milk solids and powdered sugar thoroughly and carefully to eliminate all lumps and insure a uniform mixture. If a darker color is desired, increase slightly the cocoa. Stir the butter and dry material together thoroughly. Raise the temperature after mixing to 103 to 105 deg. F. It is then ready for dipping.

The ratio of butter to dry mixture will determine the thickness of the final coating.

Precautions

Use care not to agitate the butter and dry material too much during the heating process, as this may result in "oiling off." The amount of moisture in the butter affects the body of the coating, and where the normal moisture content of the butter is reduced by evaporation a brittle coating is produced. A softer coating can be made by adding water to the butter.

Use fresh or very mildly salted butter. Make up only as used, to prevent the possibility of development of rancidity. Also, sugar crystals may become larger in unused butter and powder mixture.

NOTE: This formula was received in response to a Questions and Answers item. Although it does not seem practicable to use under present restrictions, it is so good that it is printed here as a suggestion for experimentation.

Formula from American Dry Milk Institute.

Crystalline Vitamin A Alcohol

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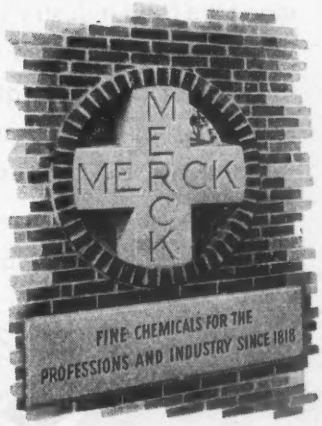
We will be glad to help you add the "plus value" which selective shoppers look for in packaged foods.



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Food Dehydration

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Free Information. If you have problems of product conveyance ask for the help of our experienced engineers and let us furnish the necessary belts promptly.

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USS CYCLONE Red Top METAL CONVEYOR BELTS

CYCLONE METAL DEHYDRATION BELTS

UNITED STATES STEEL

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RIGHT down the line, from raw material to finished, packaged product, cleanliness and good order dominate the handling of our products. Essential oils are carefully centrifuged to remove every trace of foreign substance. Containers are thoroughly washed and dried before using. Glass bottles are blown out individually with clean, fresh air to insure complete removal of dust and other particles. Filled bottles are capped with an exclusive tamper-proof top to provide absolute protection and purity of contents after leaving our plant. All of this is done under controlled conditions of atmosphere and temperature ideally suited to the handling of delicate flavors and essential oils, and in a plant that is spic and span even to its farthest corner. Truly, these are Fritzsche fetishes—*cleanliness and quality;* what is more, they're both a PART of Fritzsche products, APART from their price. Use them and be *certain* of the *best!*

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Also producers of ThiaBee, a stabilized wheat germ products rich in Vitamin B_1.

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Inquiries are invited. Literature, prices and samples to firms requesting same on their letter heads.

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This "Where to Buy" Section supplements other advertising in this magazine. It's a good habit to check this page—every issue.

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Advertising that is read with this thought in mind, may provide the solution to a burdensome problem. Remember, back of the signature of every advertiser in this issue is another organization, whose members have thought long and hard about your business in the course of introducing and applying their products or services to your industry.

If their offerings can improve the quality of your company's product . . . or save your company's money . . . they can contribute to your company's income.

We all know, "It pays to advertise." It pays just as big to investigate *what is advertised!*

Uncle Sam takes no risks with his Army chow

"Cookie" is right in keeping everybody out of his domain. Sanitary regulations overlook no precaution in guarding the purity and cleanliness of the food he serves.

That is why you find so much stainless steel in vitally important utensils and equipment in camp kitchens. Even on the trucks that follow their units into the field, bucking and careening over all sorts of terrain, stainless steel, light in weight but long on strength and durability, also helps in serving hot, wholesome meals, on the spot and on the dot.

The packers who supply the Army have long known that food tainted by metallic contamination can knock out more men than a block buster. That is why so many of them, while the equipment was still available, standardized on U·S·S Stainless Steel at every point where food meets metal.

With Stainless they can insure immaculate cleanliness, complete freedom from acid corrosion. All-important appetite appeal—tasty flavor and natural color—full vitamin content and nutritional value, also are "present and accounted for" in foods processed by U·S·S Stainless Steel equipment.

The day will come when stainless vats, kettles, evaporators, filling machines and transfer lines will be plentiful. Keep "tuned in" on the war-time performance of U·S·S Stainless Steel in food-packing equipment that is planned to jump your product quality to new highs—while processing costs take a distinct dip.

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"Be glad it's Stainless... it lasts longer!"

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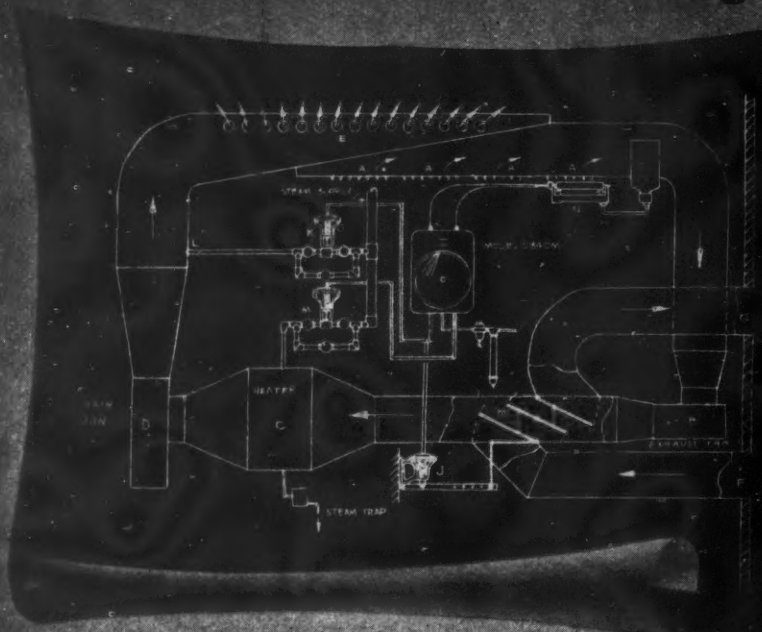
UNITED STATES STEEL

4 Ideas HELPING TO INSURE

Review of Food Processing in Wartime Reveals Importance of Automatic Recording and Control



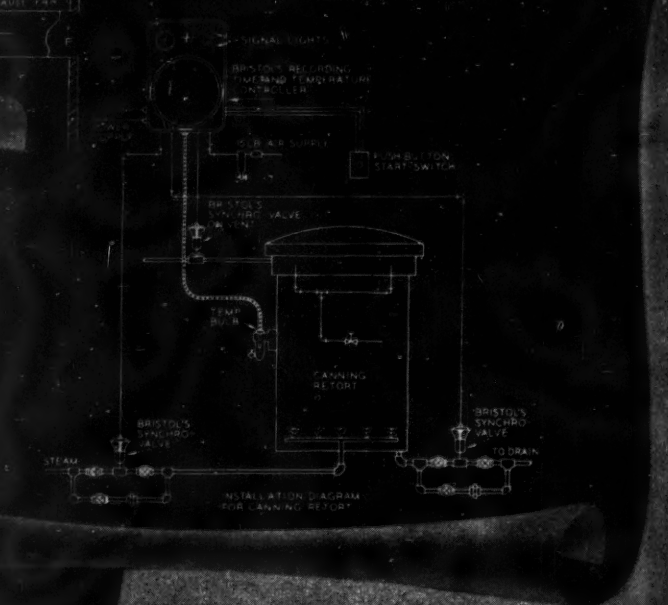
Typical Examples:

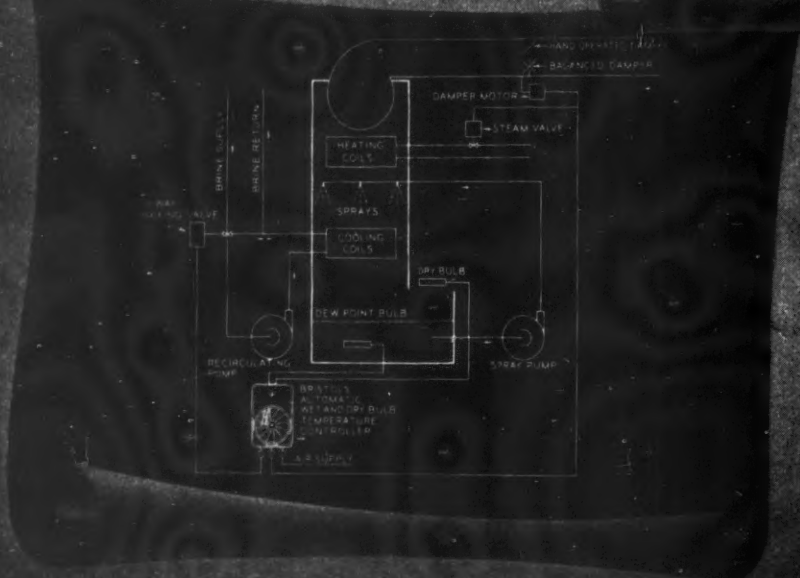
DEHYDRATION

Whatever your dehydration method, Bristol engineers offer you the benefits of wide, practical experience in applying specific instruments to the control of temperature, relative humidity and air flow in food processes. Alert to dehydration developments, they are ready to place the latest, proven facts and figures at your disposal.

CANNING

Bristol's System of Completely Automatic Retort Control operates all phases of the process from the time the containers are put into the retort and the cover is closed until the containers are removed. After the cover is clamped shut, it is only necessary to push a button in the front of the retort. Processing is completely automatic and uniform throughout the batch. Chances for error are eliminated.





MEAT TENDERIZING

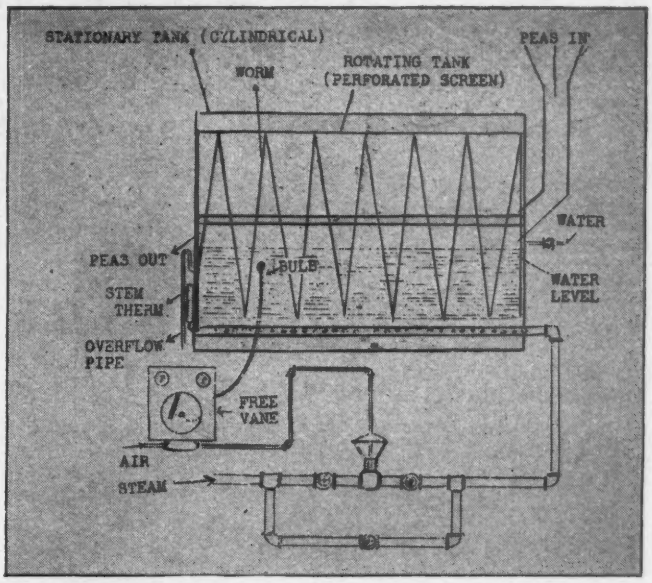
Bristol's automatic temperature and humidity controls on the TENDERAY PROCESS are helping to make possible a better, more palatable product . . . guarded against bacteria . . . with nutritive constituents preserved . . . with grading simpler and more uniform . . . and with the possibility of tremendously increased sales.

3 Square Meals

In their struggle to supply America's food needs against the handicaps of wartime scarcities in food materials and manpower, food processors are turning to experienced instrument-engineering for aid in stopping spoilage, protecting flavor and vitamins, saving fuel, increasing speed of certain operations. Charts on these pages are a partial indication of Bristol's contribution in solving these problems.

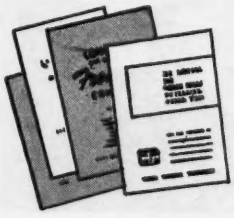
Pioneers in many fields of automatic control, Bristol engineers were first to work with food industries on dehydrated milk processes more than 10 years ago, and first to engineer successful controls for these processes.

In dehydrating, canning, meat-tenderizing, as well as the other food processes . . . wherever temperature, flow, liquid level, pressure, draft, time-of-operation, humidity, vacuum, and pH value must be controlled . . . Bristol's instrument-engineering has eliminated the uncertainties of manual control, and has replaced it with precision regulation.



BLANCHING

In blanching before dehydration, varying temperatures of 190° to 210° (depending on batch size and hardness) had to be held from 2 to 10 minutes. Bristol Free-Vane Controller, operating diaphragm valve in steam line, made constant watching unnecessary, reduced spoilage and fuel costs.



Free Bulletin Service Helps Solve Food-Instrument Problems

- **Bulletin A-112.** Complete facts on the Bristol Free-Vane System of Control, now used in many food plants.
- **Bulletin 550.** Instruments for dairy industry.
- **Bulletin 38.** Automatic control in canning industries.
- **Bulletin 512.** Coordinated controls for plant processes as installed in food, textile, metal, plastics, rubber and other industries.

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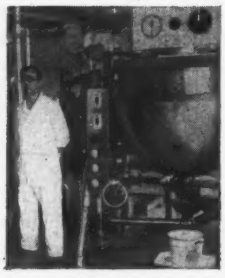

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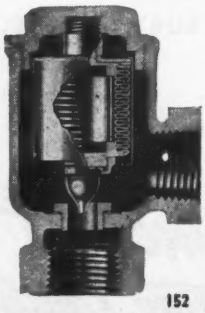

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Thin, tough, transparent Sylvania* Cellophane . . . peer of packaging . . . protecting America's foods. . . on the home front . . . on the fighting fronts. Serving, too, various and very important military requirements. To its quality story there is now being added many new chapters of service—chapters that will greatly enhance Sylvania Cellophane's future usefulness.

SYLVANIA INDUSTRIAL CORPORATION

General Sales Office: 122 East 42nd Street, New York 17, N. Y.
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TIME OUT for P.M. Service means MORE TIME on the Job

INVEST IN VICTORY . . . BUY WAR BONDS AND STAMPS

"An ounce of prevention is worth a pound of cure" is an old saying which has a new meaning for truck owners these days. With their equipment doing double duty on the home front, Preventive Maintenance Service is doubly important. General Motors Truck dealers offer the only P.M. Service backed by 15 years of experience with all types of vehicles in all types of operations. It is called GMC "Victory Maintenance" because it provides for regular inspections, services and repairs needed to keep trucks pulling for victory!

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GMC TRUCKS

GASOLINE • DIESEL

Pledged U.S. TRUCK CONSERVATION CORPS

GMC VICTORY MAINTENANCE KEEPS YOUR TRUCK ON THE JOB

A WIDE CHOICE OF NEW MODELS STILL AVAILABLE THROUGH GMC'S NATIONAL INVENTORY PLAN

Speed Wartime Production with Fast, Efficient...

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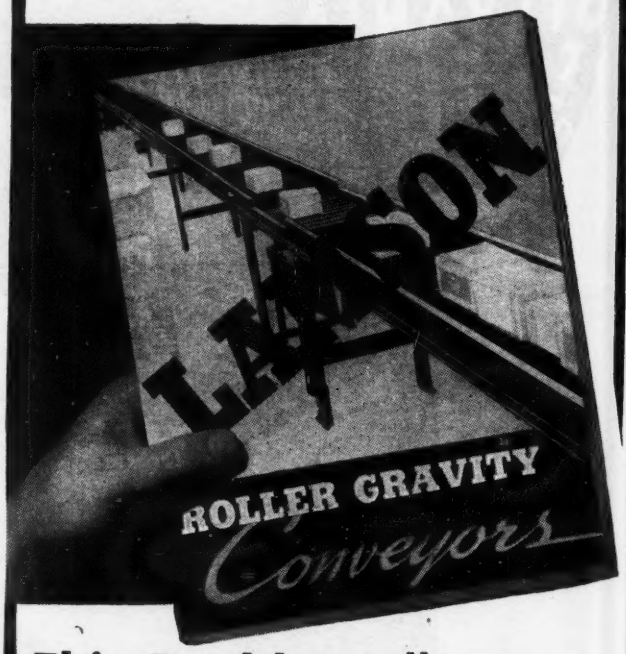
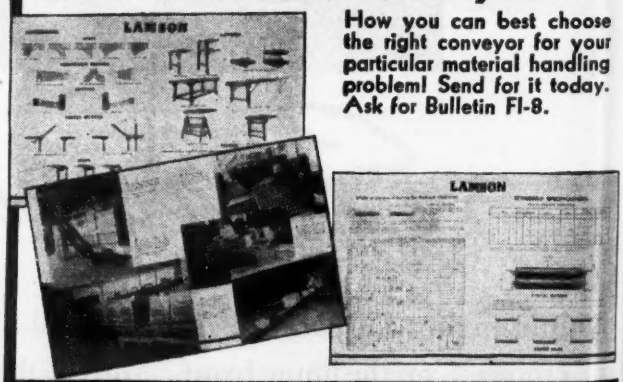
Roller Gravity Conveyors

No matter what your product is, a Lamson Conveyor can help you get it moving — and get it out — quicker and easier, with less waste time and less manpower. Send for your free copy of this new 16-page Booklet that will tell you all you want to know about how Roller Gravity Conveyors can take an active part in your business, and what a large part they are already playing in material-handling across the country.



This Booklet *tells you...*



How you can best choose the right conveyor for your particular material handling problem! Send for it today. Ask for Bulletin FI-8.

LAMSON CORPORATION

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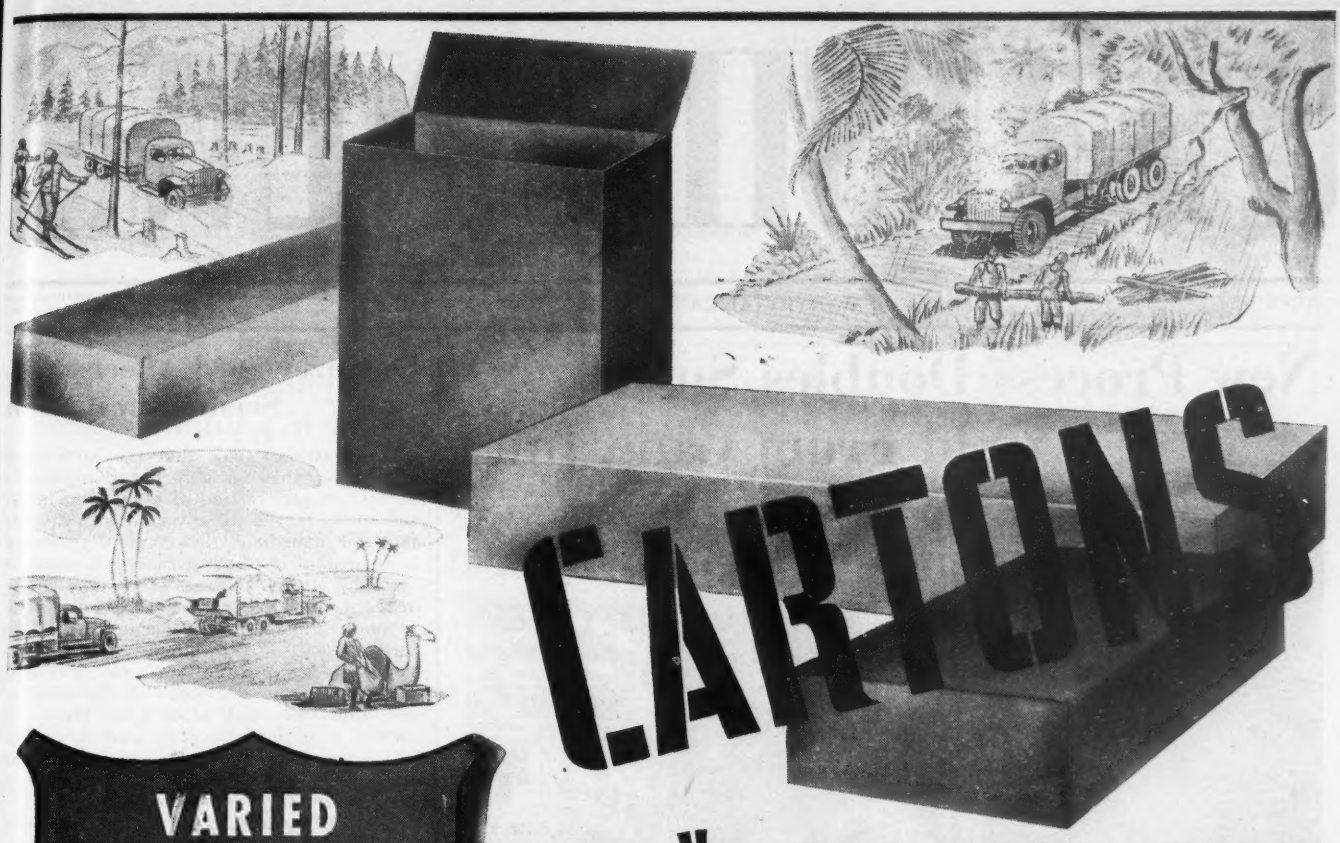
Makers of Conveyors and Pneumatic Dispatch Tubes



CARTONS

TO "DELIVER THE GOODS" *INTACT*

IN war goods packaging the carton is more than a carrier, more than a "frame" for its contents. In its construction and in its component materials there are opportunities to add *protection*, vitally needed for war's world-wide distribution. Protection against moisture-gain or loss, against sifting, grease penetration, insect infestation — these properties and more can be "built in" to war goods cartons. Menasha's facilities for producing, laminating and treating paperboard and Menasha's modern carton fabricating plants are producing millions of war materiel cartons to "deliver the goods" intact!

Send for our "Wartime Packaging" Booklet today

WAR PRODUCTS DIVISION
THE MENASHA PRODUCTS CO.
Division of Marathon Paper Mills Co.
MENASHA, WISCONSIN

VARIED PAPERBOARDS AND CONSTRUCTION

A special munitions carton construction by Menasha made it possible to machine-package certain shells, saving time and labor . . . A laminated moisture-proof board keeps Army ration tablets dry and fresh . . . A laminated grease-proof board makes a perfect consumer-size package for dried eggs . . . Lend-Lease dried soups are packed in a laminated moisture-proof carton which is constructed to be completely sift-proof . . . All are Menasha made. There are hundreds of varied ideas in composition and construction of war cartons which Menasha's pulp-to-carton production makes possible for your war job.

MENASHA

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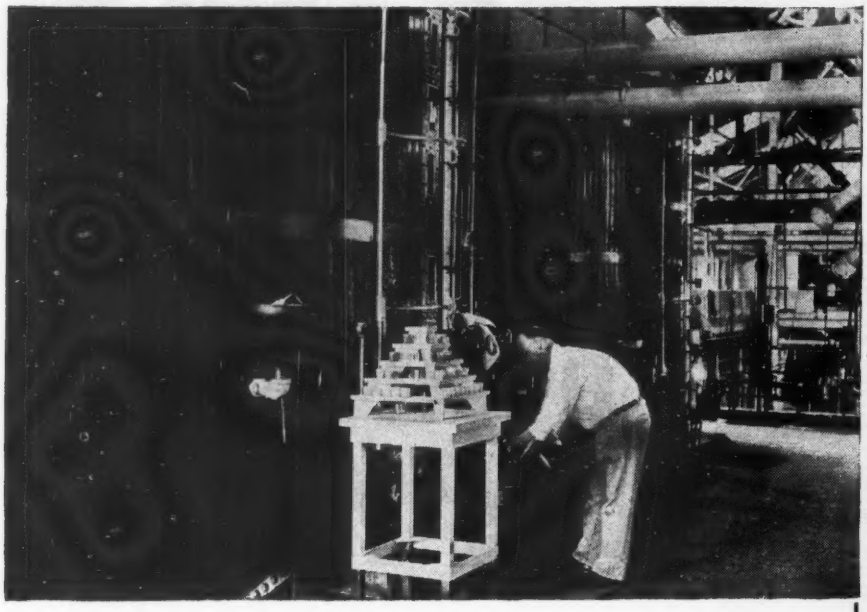
CARTONS, LINERS
BAGS AND OVERWRAPS

INSIDE NEWS

AUGUST PREPARED BY NATIONAL CAN CORPORATION, NEW YORK, N. Y. 1943

New Process Doubles Sugar Yield From Cane Juice



To preserve vitamin content in the new sugar, a dehydrating method similar to that in drying blood serum is used.

By a new process of making sugar, a sweetener has been produced which retains the high mineral and vitamin content of the raw cane juice. This new sugar is seen as a boon to civilization in that it will help to combat tooth decay resulting from diets deficient in minerals and vitamins.

Preservation of the vitamins in the new sugar is made possible by processing the cane juice without the use of high temperatures, the process being a dehydrating method similar to that used in drying blood serum. In brief, this is how the sugar is made: The cane juice is filtered and treated with a solvent to kill the bacteria, the solvent evaporating and leaving nothing harmful in the sugar. Then the juice is frozen, giving pure water ice crystals intermingled with a solution which is more concentrated by virtue of the removal of the water contained in the ice crystals. Next, the frozen mass is chipped and placed in a centrifuge bowl which separates the sugar solution from the ice. A repetition of the freezing and centrifuging process several times produces a cold-process syrup which has not been subjected to heat at any time. To this syrup is added a small quantity of a grain extract (wheat, flax, barley) which has the property of altering the attraction of the cane juice for the water.

This syrup is now readily dried to a crystal or powder form by any of the standard equipment used in dehydrating eggs or milk. The resulting product is a cream-colored, sweet-tasting substance with a distinctive flavor, differing from other sugar in that it has a tartness found in very sweet orange juice.

Analysis of the new sweetener shows a 3½% mineral content, together with the vitamins A, B complex, C and K.

The sugar yield from the cane juice is said to be doubled by the new process, as it is possible to obtain only about half the sugar of the juice by the customary crystallization method. (400)

* * *

Increasing the fish population by methods similar to the use of fertilizers for agriculture is a British idea. The addition of nitrogenous compounds and phosphates to the water in a small Scottish loch by a leading marine biologist, increased the flounder catch ten times by weight. (401)

Fertilizer Seed Affects Seed Germination

Investigations show that the method of placing fertilizer on snap beans apparently affects the germination of the seed. The result shows that fertilizer mixed with the surface soil immediately before planting caused a reduction in seed germination ranging from 1% to as much as 35%. The injury appears to be greater when there is a scarcity of moisture, since the concentration of the fertilizer salt is then greater. Placing the fertilizer on top of the row caused a limited amount of injury in some of the planting and apparently took place when there was enough rainfall to carry the salt downward to the vicinity of the seed. The damage was least severe with this method when no rain fell for several days after planting.

Fertilizer placed in bands two inches to each side and two inches below the seed level apparently produced no injury to the seed and produced stands fully as good as those obtained in the unfertilized check row, irrespective of the soil moisture content. The seed germinated in, and the tap root grew into, a zone of soil between the bands of fertilizer which was comparatively free from any appreciable concentration of salts because of the limited lateral movement of the solution from the bands of fertilizer.

Fertilizer placed in a band directly beneath the seed reduced the stand of seedlings by as much as 22%. In most cases this was about as injurious as the first method reported where the fertilizer was mixed with the soil at the surface. (402)

Cranberry Research

Increased yields of cranberry sauce were reported when the extraction of the berries with water at 185° to 195°F. for 20 to 25 minutes was used instead of the usual short time extraction at the boiling point. By employing this method it was stated that pectin is conserved and a sauce of improved quality results.

Cranberries were found to contain small amounts of riboflavin, pantonthenic acid, and thiamin not previously reported. About 25% of the cranberry crops is now used for canned or other manufactured products. Cranberry juice and cranberry sauce were shown to be definitely bacterio-static for many bacteria of the food poisoning group. There were also indications that these foods had a marked cleansing action in the mouth. (403)

* * *

It is learned that upon the request of the Department of Agriculture, the War Production Board is allocating sufficient metal for the production of 150,000 pressure cookers needed for this year's canning season. It was stated that these pressure cookers will be distributed by the Department of Agriculture under a rationing system through County USDA War Boards. (404)

NATIONAL CAN

PLANTS: NEW YORK • BOSTON • BALTIMORE • CHICAGO • HAMILTON, OHIO • FORT WAYNE, INDIANA

Motion Picture Demonstrates Canning Methods

A full color 16 mm. motion picture with sound called "Canning the Victory Crop," was released for public distribution. In order to assist the millions of Americans who are going to do their own canning this fall, home economists who have specialized in this field will demonstrate canning methods approved by the Department of Agriculture. There will also be a booklet containing time charts, recipes, and detailed instructions for "putting up" all kinds of fruits and vegetables available at cost for distribution among the audiences who view the film. (405)

Now You See 'Em— *Now You Don't!*

American soldiers' lives are saved—in untold numbers—by modern technics of "smoke screen" maneuvers. The "HC-SMOKE" must be carried in containers specially made for the purpose. Providing such containers for "smoke"—and for a variety of other military products too—is one of the many essential wartime jobs we are doing at National Can. (406)

Bean Varieties Resist Halo Blight

Several selections of green and wax snap bean varieties have been made at a well-known university which give promise of being resistant to halo blight and anthracnose. These two diseases are the two most troublesome in the northern Maine climate. Selections were made from crosses of Hercules with Conserva and Hercules with Brittle Wax and show promise for canned and frozen packs. The strains are being continued for further tests. (407)

* * *

A new chemical compound, which really works in killing odors, including skunk, putrefaction odors, kitchen odors, etc., is being used by hospitals. (408)

Technical Topics

ALL-PURPOSE SOAP—A new specification covering two types of all-purpose soap for use by army personnel throughout the world under varying conditions of water hardness, and for a wide variety of diverse uses such as hand washing, laundry, general cleaning, shaving, shampooing, etc., has just been released. Samples of the new soap are now being subjected to actual use tests as well as laboratory studies. (409)

SYNTHETIC INSECTICIDE—A new synthetic insecticide has recently been developed which promises to offer considerable assistance in augmenting depleted supplies of rotenone for agricultural crop protection. Tests of the new product at several State Experimental Stations are said to indicate that the addition of 2% to agricultural dusts cuts in half the amount of rotenone required to do an effective insect-killing job. (410)

ALLIGATOR OIL—The alligator, plentiful in Brazilian rivers, may be controlled by its new industrial value. In addition to the skins, the oil, mixed with fuel oil, is being used by an electric power plant. The liver oil has been found of value in cosmetics. (411)

WATER SOLUBLE CELLULOSE (sodium cellulose glycolate) is a gelatin substitute developed abroad which may replace in many products agar-agar, gum arabic and tragacanth, and may have uses as a stabilizer in food products. (412)

RUBBER-LIKE CONDENSATION PRODUCTS obtained from sulphur and olefines, or from polysuphides and other organic compounds, can be dissolved in crude and refined basic fractions of coaltar to produce clear solutions useful as paints and in impregnating. The rubber-like compounds are particularly resistant to the action of solvents and have been found important for technical purposes. (413)

CHLORINATED PARAFFINS when treated with alcoholic or concentrated aqueous caustic alkali, or subjected to pyrolysis, split off hydrogen chloride and form double bond compounds that may in turn be reacted with malic, maleic, and similar acids to form oily condensation products having drying properties which may be used directly in paints, varnishes, and lacquers. Air-dried films from the condensation products or their soluble ester products have a hardness comparable with that of copal varnish, while baked films are as hard as stove enamel. (414)

ALLYL PHTHALATE is being investigated for producing hard, heat-resistant finishes on metals. Its use for coating food containers after the war is also being discussed, although technical problems concerned with the sealing of such containers with the new coating have not as yet been completely solved. (415)

BENTONITE is suggested as a suspension agent for bituminous emulsion paints of high covering power suitable for coloring road surfaces, especially concrete, and for camouflage purposes. The 10-12 percent dispersions of bitumen may be pigmented with such materials as iron oxides, chromium oxide, or carbon black. Alkali caseinates may also be used to emulsify the bitumen. (416)

SUBSTITUTE FOR SHELLAC — Nige wax, produced by a Guatemalan insect resembling the Asiatic lac, was recently suggested as a possible substitute for shellac. Indians in the interior of Guatemala use the material to finish ornamented gourds and wooden art objects. Commercial production is not as yet reported. (417)

RHENIUM is being extracted from the flue dusts obtained in the roasting of Western molybdenum ores, utilizing a process developed by two Tennessee chemists. The rare metal has a high melting point, exceeded only by that of tungsten, and its density is exceeded only by those of platinum, iridium and osmium. (418)

HYDROBROMIC ACID PRODUCTION can be considerably facilitated and rendered more suitable for technical performance by carrying it out in a two-stage process . In the first stage of the process described, sulphur bromide is formed by dissolving sulphur in elementary bromine, while in the second stage the sulphur bromide, additional elementary bromine, and water are reacted to form hydrobromic acid and sulphuric acid. (419)

SODIUM SULPHITE is incorporated in a new British soap to combat dermatitis caused by formaldehyde synthetic resin glues employed in aircraft construction. An acid liquid soap is also offered for casein adhesives. (420)

Every effort will be made to furnish additional information on these articles. Where such information is not obtainable, we will refer inquiries to the original source of the article. Write to National Can Corporation, 110 East 42nd Street, New York City. Please mention the number at end of article—also name of the magazine you saw it in.

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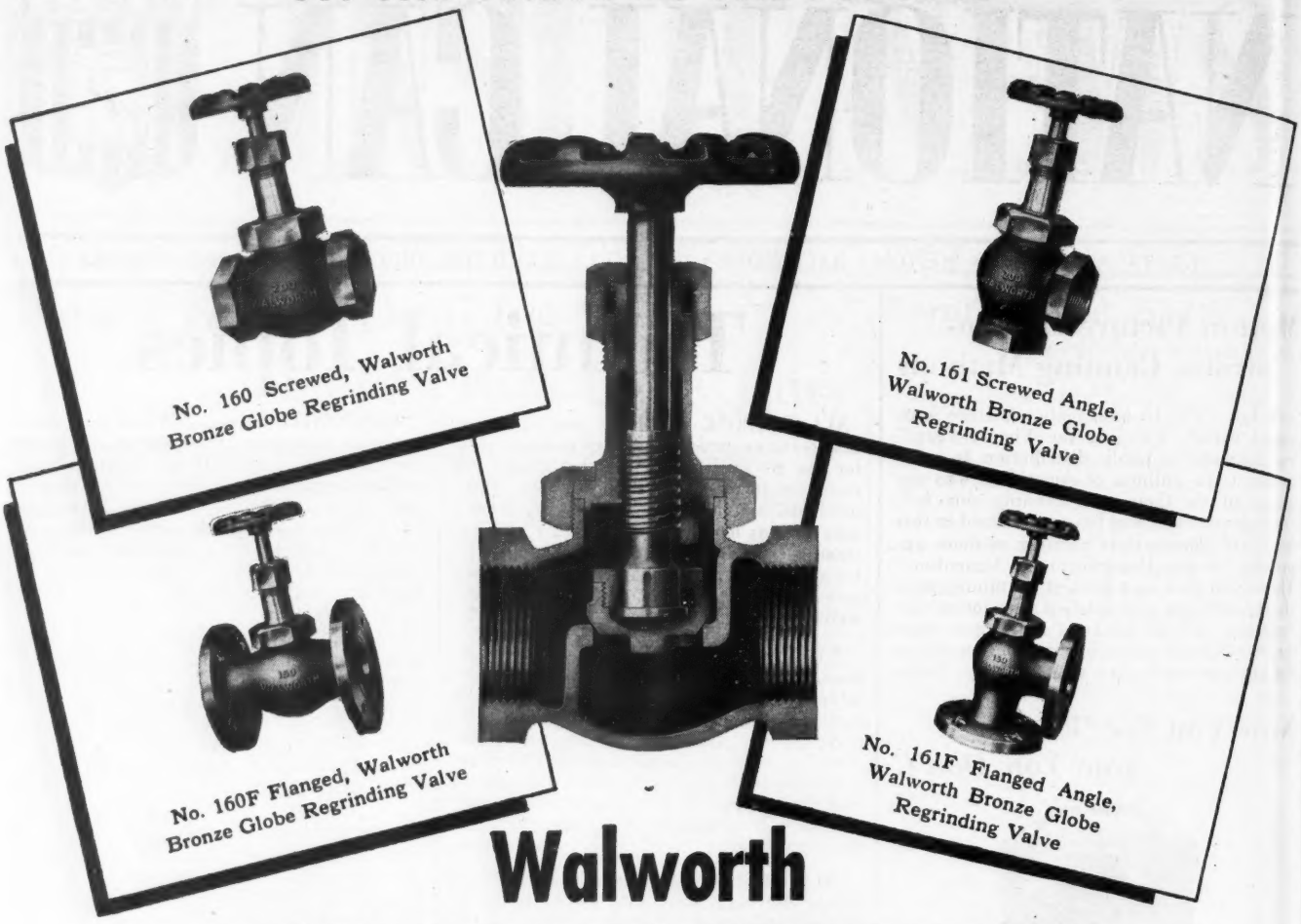
FIT THE VALVE TO THE SERVICE


No. 160 Screwed, Walworth Bronze Globe Regrinding Valve
No. 161 Screwed Angle, Walworth Bronze Globe Regrinding Valve
No. 160F Flanged, Walworth Bronze Globe Regrinding Valve
No. 161F Flanged Angle, Walworth Bronze Globe Regrinding Valve

Walworth
BRONZE REGRINDING VALVES

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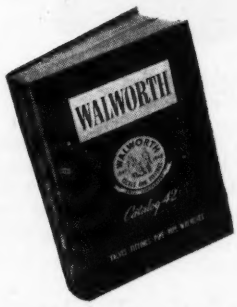
choose the type that fits your service

When you need a Bronze Valve select from Walworth's *complete line* the one that precisely fits your service. Take this line of regrinding valves, for example. These valves are made both in Globe and Angle types with either screwed or flanged ends. Union Bonnets give added strength. All valves have bronze discs and full-way seats. Moreover, well proportioned stuffing boxes and glands assure leak-proof operation. These valves can be repacked under pressure when fully opened, and should the seats and discs become worn, they can be reground.

Each Walworth Valve has distinctive features of design and construction. You can save time, material, and much troublesome maintenance when you "fit the valve to the service."



To help you "fit the valve to the service," you'll find pertinent information on Walworth's complete line of valves, fittings, pipe, and pipe wrenches in the New Walworth Catalog 42. Included are 78 pages of practical engineering data that simplify valve selection and make piping layouts easier. Write, on business stationery, for your free copy. Address: Walworth Company, 60 E. 42nd St., New York 17, N. Y., Department 82.

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NO NEED FOR COMPLEX EQUIPMENT

Vault fumigation no longer needs to be a complicated, time-consuming operation. Now, with Dow Methyl Bromide, *the penetrating fumigant*, you can treat your products quickly and simply—with complete success.

Methyl Bromide has been found to be a superior chamber fumigant because of ease of application, low cost and, above all, its remarkable penetrating powers. Reaching into the center of every bag and package, even heavy boxes used for food shipments to our armed forces, Methyl Bromide effects a complete kill of all insect life. Methyl Bromide vents rapidly—speeding fumigation cycles and permitting treatment of large quantities of food within a short period.

Detailed information on vault construction is available on request.

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THE PENETRATING FUMIGANT

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GLOBE STEEL Tubes

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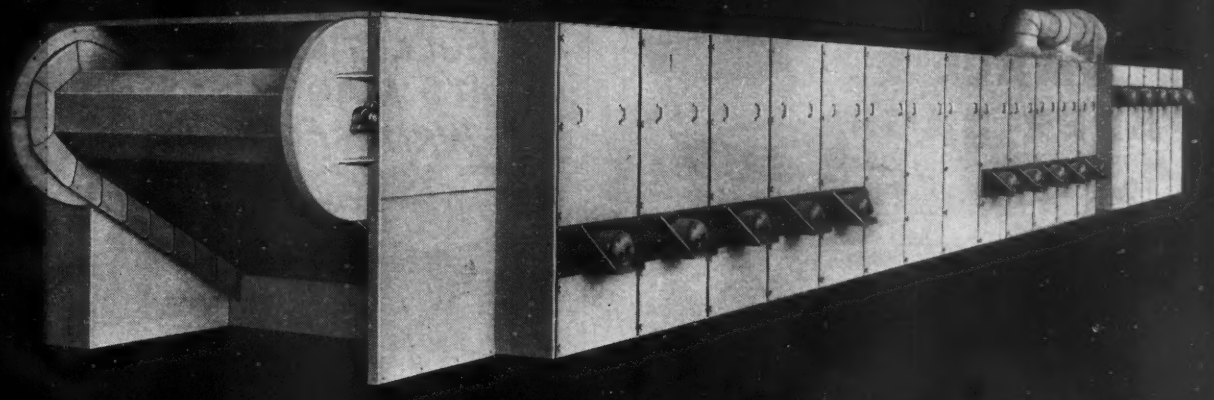
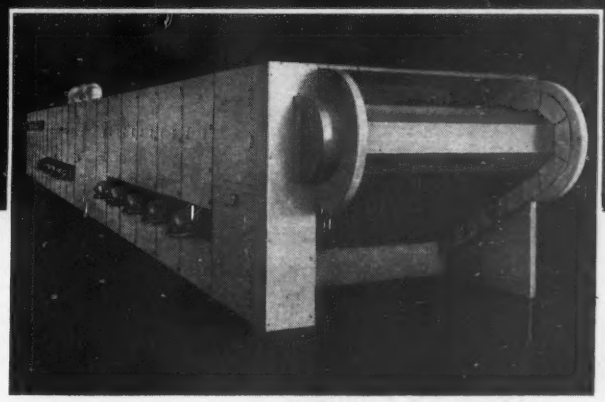
GLOBE STEEL TUBES CO., *Milwaukee, Wisconsin, U.S.A.*

The HUNTER *continuous dehydrator*



FOR AUTOMATIC, UNIFORM PRODUCTION



Illustrations show the new HUNTER Continuous Food Dehydrator. It comes completely equipped with all necessary controls for maintaining necessary temperatures and humidity. It is adaptable to continuously dehydrating a wide variety of food products.

The operation of this new, modern HUNTER unit is completely automatic from the time the blanched product is delivered to the feed end of the dryer until the completely dehydrated product is delivered to the proper containers.

For full details on this modern unit write to HUNTER ———

JAMES HUNTER MACHINE CO.
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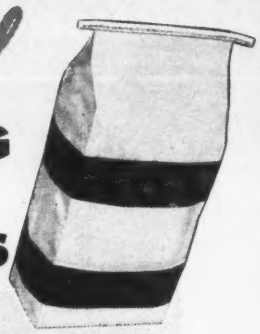

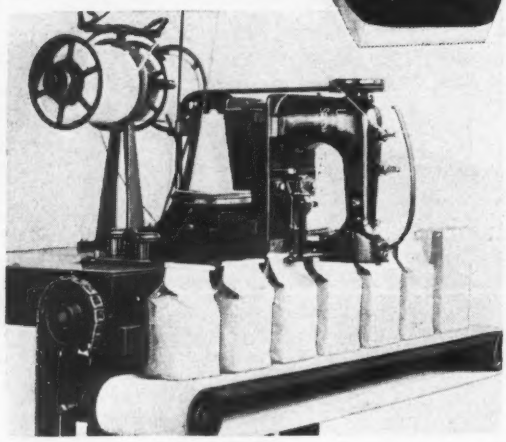

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- Produces neat, strong packages.
- Can be used with any fillers, weighers or packers.
- Fully automatic or semi-automatic installations available.
- High speed . . will handle output of any filling equipment.
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THE Dubl-Tape Sewed Closure for 1 to 10 lb. filled paper bags, produced by the Union Special 60000 C Sewing Head provides a package that fills the bill in every respect. The machine automatically applies a narrow strip of paper tape to each side of the bag top, sews through tape and bag, trims the bag top and clips the tape between bags. For novel merchandising effects, colored or printed tapes may be used. For full details write today.

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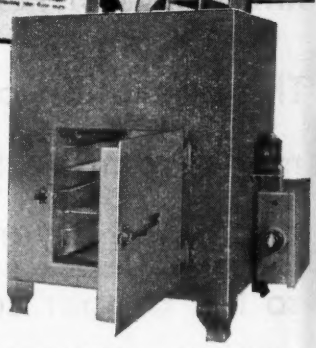

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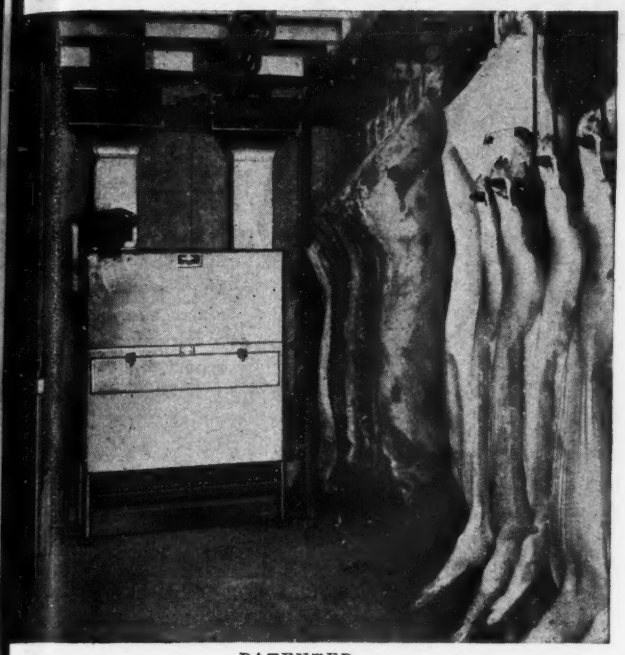

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NIAGARA "No Frost" System eliminates icing of cooler coils and shut-downs for de-icing. It gives increased capacity from compressors and increased refrigerated space from the same compressor equipment.

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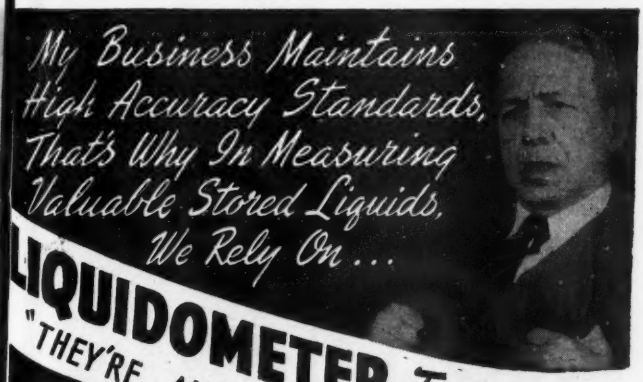
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LIQUIDOMETER Tank Gauges
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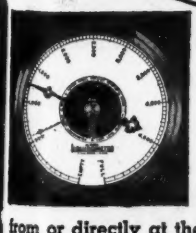

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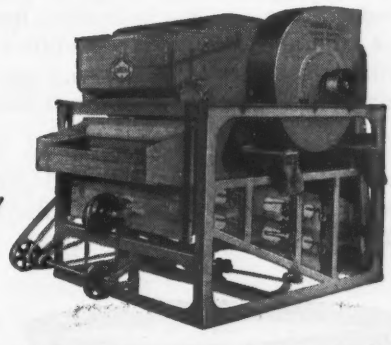

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IS TEMPERATURE A *SABOTEUR* —in Your Plant?

To prevent production holdups . . . to avoid waste . . . mount MOTOCO Indicating Thermometers at every point in the plant where uniform temperatures must be maintained. These accurate indicating instruments serve to simplify and speed-up temperature observations . . . the indicating head may be mounted where observation is most convenient, at some distance, if necessary, from where the temperature is taken.

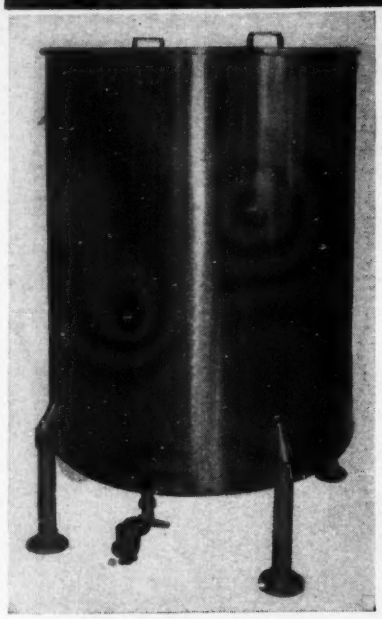
For further information write to: The Electric Auto-Lite Company, Moto Meter Gauge & Equipment Division, Chrysler Building, New York, N. Y.

Motoco Indicating Thermometers have rigid stems for direct mounting or may be obtained with capillary tubing for remote reading. Model F-1, illustrated, $20. • Motoco Recording Thermometers are priced from $31.

MOTOCO

INDUSTRIAL THERMOMETERS

STAINLESS STEEL TANKS



35, 60, 100, 160, 200, 300, 400 and 500 gallon sizes

TERRISS Standard Tanks are made from 18-8 Stainless Steel. They are highly polished inside and outside with a No. 4 finish, pitched bottom and self-draining, and are furnished complete with Stainless Steel Covers. The stands may be either strong angle iron construction or pipe leg type. Built-in agitators can be supplied for either fast or slow speed.

We also build tanks to your specifications. All orders subject to preference ratings.

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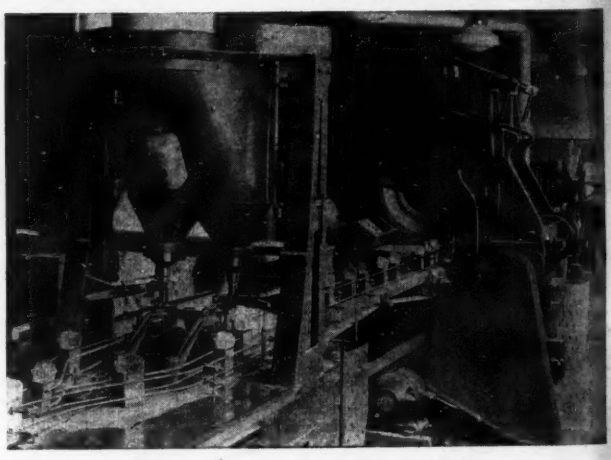


SYNTRON

"Noiseless—Pulsating Electromagnet"

HOPPER VIBRATORS

Will increase the efficiency of your packaging machines—

Assure an ever ready discharge of material from other bins, hoppers and chutes—

By eliminating the "Arching-over" and "Hanging-up" of stubborn materials.

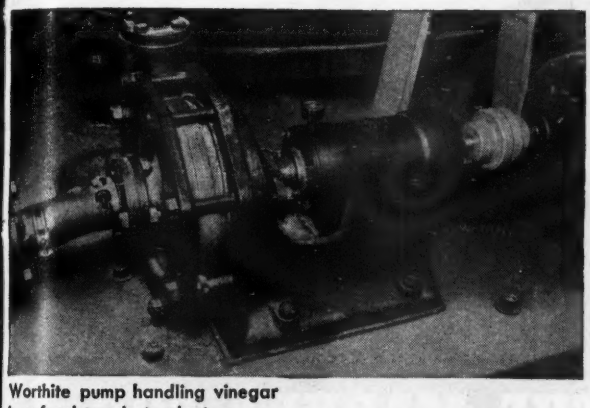
V-9 and V-15

CAPACITIES: The Model V-9 can be applied to hoppers of up to 2 cu. ft. capacity and constructed of 1/16" metal—the Model V-15, to hoppers of up to 7 cu. ft. capacity, of 1/8" metal.

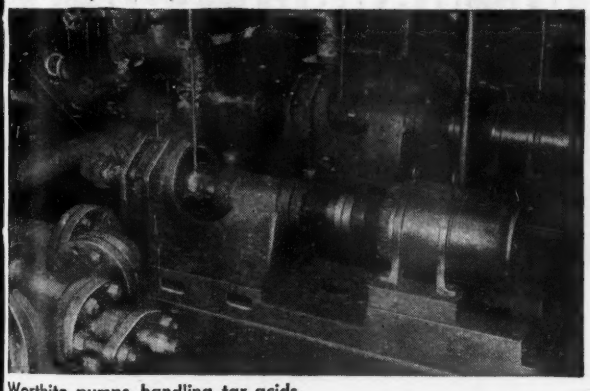
Catalog information on request

SYNTRON CO. 460 Lexington Ave., Homer City, Pa.

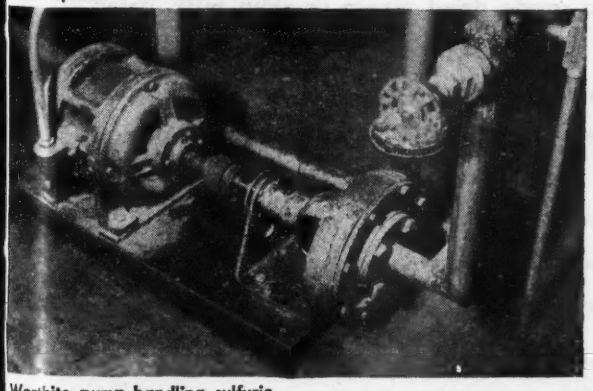
» NO CORROSION
» NO CONTAMINATION
» NO OUTAGES
with WORTHITE
PUMPING EQUIPMENT



Worthite pump handling vinegar in a food products plant



Worthite pumps handling tar acids and napthaline at 200°—230° F



Worthite pump handling sulfuric acid and sulphurated oil

CP3-5

IF your processing involves pumping almost any kind of corrosive liquor you'll find this alloy, WORTHITE, as used in Worthington Pumps, will give you long, trouble-free service. It is already widely used in many industries—explosives, dyestuffs, acid manufacture, fertilizers, paper, pulp, petroleum, coke by-products, metal refining, pigments, plastic, rayon and food products. Other important uses are being continuously found.

WORTHITE is a complex alloy jointly developed by the metallurgists of Lebanon Steel Foundry and Worthington Pump and Machinery Corporation.

WORTHITE pumps are available to those processors whose war production activities give them priority.

Our descriptive bulletins on WORTHITE pumping equipment offer ideas and information which you can use in planning new or expanded processing operations.

Both the Navy E and Army-Navy E Awards have been presented to Worthington for speed and excellence in production.

WORTHINGTON

WORTHINGTON PUMP & MACHINERY CORPORATION • GENERAL OFFICES: HARRISON, N. J.

THE GRAY-JENSEN SPRAY PROCESS DRYING PLANT

Now and for years to come

THE WORLD IS THE MARKET FOR DRIED FOOD PRODUCTS

The present record-breaking world-wide demand for dried milk, dried egg and other dehydrated food products is only the beginning. For years to come, it will continue to be big business. Now is the time to investigate the profit possibilities for your company, co-operative or community.

To get maximum output of natural flavor, extra grade dried whole or skim milk, dried egg and other food products at the lowest manufacturing cost per pound of powder produced, let skilled Douthitt engineers design and install complete, a Gray-Jensen Spray Process Drying Unit for you.

Inquiries are given prompt attention. Write today for further details.

DOUTHITT GRAY-JENSEN

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- Frozen food cabinets
- Food storage refrigerators and display cases
- Ice cream cabinets
- Water and beverage coolers
- Commercial refrigeration equipment
- Air conditioning
- Also machine tool cooling equipment

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REFRIGERATION IS OUR BUSINESS

Certainly your customers expect advanced design in postwar refrigeration equipment. But the accent, as always, will be on performance. And that's where Universal Cooler can help

In nearly a quarter-century's experience in the manufacture of refrigerating units, Universal Cooler developed many important "firsts" in the industry. Today, concentrated production for all branches of the Armed Forces is adding further improvements both in unit performance and production efficiency. However, part of Universal Cooler's expanded research-engineering facilities are available now, to help you adapt these innovations to your post-Victory plans.

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WE SELL TO MANUFACTURERS ONLY

UNIVERSAL COOLER CORPORATION • *Automatic Refrigeration since 1922*

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Looking Forward

Wartime achievements in science are developing an era of progress which challenges the imagination.

All that Spencer is doing now —producing microscopes, periscopes, telescopes, aircraft and anti-aircraft gunsights, prism binoculars, azimuth instruments for directing artillery fire, tank sights, telescopic alidades for navigation, projectors for instruction—will reap peacetime rewards in advanced knowledge, better manufacturing techniques, finer instruments.

At the war's end, Spencer will be ready to serve scientific optical needs on a far broader scale than ever before.

ARMY E NAVY

Spencer LENS COMPANY
BUFFALO, NEW YORK
SCIENTIFIC INSTRUMENT DIVISION OF
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FOR VACUUM PROCESSES— STEAM-JET EJECTORS

Steam-jet ejectors are a reliable and efficient means of removing air, gas or vapors from vacuum chambers in industrial processes. Ingersoll-Rand can furnish ejectors for practically any capacity and for absolute pressures as low as 50 microns Hg. Ask the Ingersoll-Rand engineer for details.

Twin-element, two-stage steam-jet vacuum pump with intercondenser.

Two-stage ejector mounted on a barometric-type aftercondenser.

4-288

Ingersoll-Rand
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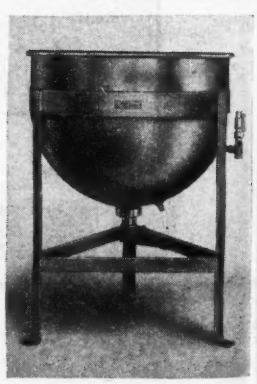
On land...

on sea...

LEE

Wherever our American boys are fighting,—these dependable processing kettles are doing a swell job day in and day out—throughout the world. Stainless, corrosion resistant—easy to clean. Do you have the latest Lee catalog in your reference files?



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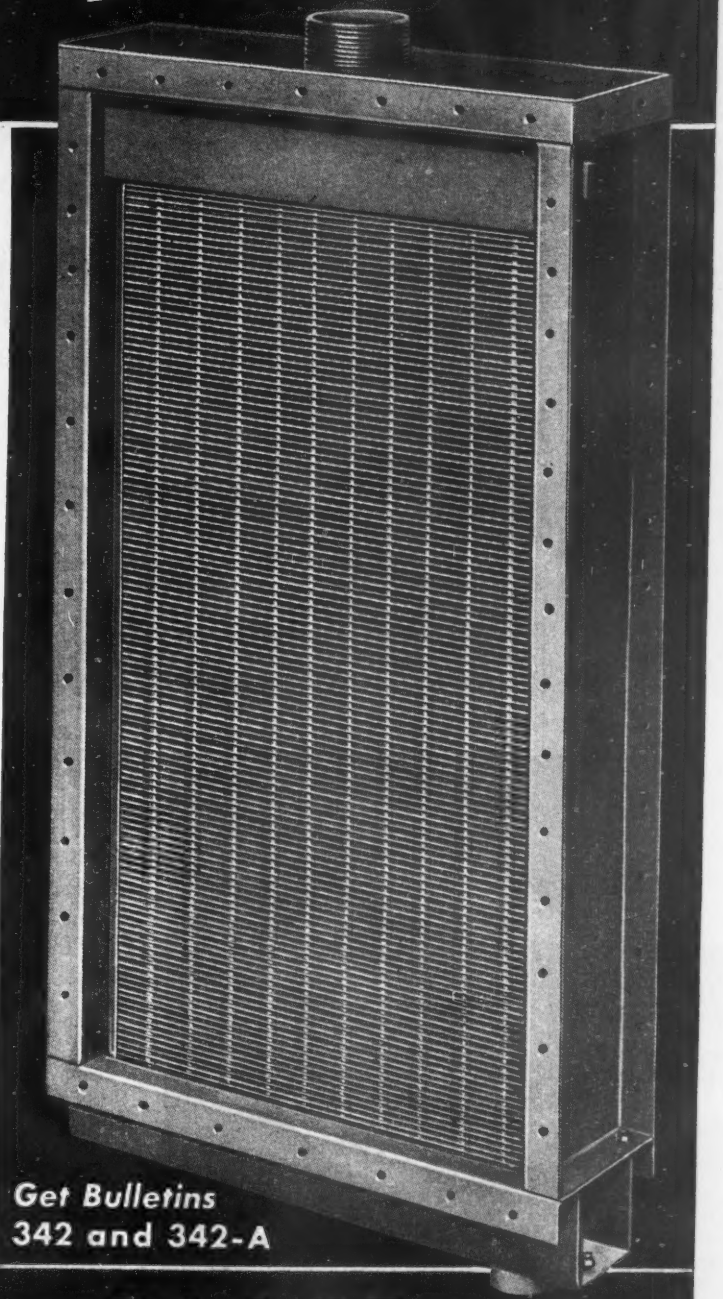
SPECIALLY TREATED TO Resist Rust

fins ✓
tubes ✓
headers ✓
casings ✓



. . . for use in dehydration plants

Free moisture and acids from foods being processed will corrode steel tubes, fins and headers of blast heaters used in dehydrator tunnels. Corrosion not only cuts service life but materially reduces heat transfer capacity—unless heater is properly protected.

Modine Blast Heaters are specially treated to assure this proper protection—

1. Fins, tubes and headers are dipped in molten lead alloy giving them a coating that resists rust and corrosion.

2. Fins are *permanently bonded* to tubes *with metal*—thus sealing the all-important contact of fin collar to tube wall against corrosion.

3. Tubes are heavy—with extra thick walls (65/1000 inch) to reduce corrosion hazards... and made of ingot iron.

4. Casings are constructed of heavy steel channels... *Parker-Bonderized* for protection from rust ...and painted.

Modine Blast Heaters are made in a wide range of sizes and fin and tube combinations—to meet your requirements exactly.

Modine Coils and Unit Heaters Available to Industries Doing War Work

Look in your phone book for Modine representative's name—"Where to Buy It" section under "Heating Apparatus."

MODINE MANUFACTURING COMPANY
1822 RACINE STREET RACINE, WISCONSIN

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ENDURING QUALITY

38 YEARS OF DEPENDABILITY

In these times, when refrigeration equipment *must not* fail, thousands of owners, in 65 countries, are glad that they chose BAKER. Never before has "being good" been so important.

BAKER ICE MACHINE CO., INC., Omaha, Neb.

BAKER COMMERCIAL AND
INDUSTRIAL REFRIGERATION

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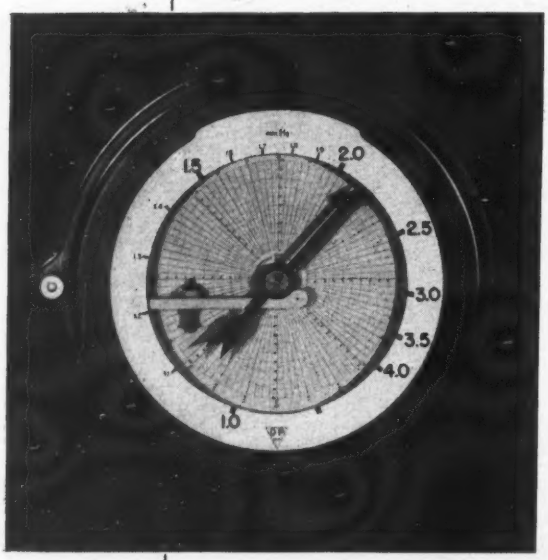
A New Recording High-Vacuum Gauge

with Automatic Controls



WITH the introduction of its Recording High-Vacuum Gauge, Distillation Products, Inc., continues to provide equipment of modern design for the increasing number of industrial high-vacuum processes.

This new meter comprises a specially stabilized Pirani Gauge in combination with any of the well-known types of electronic or mechanical potentiometer recorders. Indicating scales of 0 to 500 microns or 1 to 4 mm. of Hg are available, and the instrument can be furnished with a round chart or the multi-point strip chart. Other scale ranges, and calibration for hydrogen or other gases, are available on request. Controlling contacts for the operation of alarms, switches, valves, and other devices can be installed.

If you use vacuum apparatus, get full information about this new "overseer of emptiness." Drop us a line stating your particular problem. Our instrument engineers will be glad to recommend the model best adapted to your needs.

DP INC. HIGH-VACUUM HEADQUARTERS

DISTILLATION PRODUCTS, INC.

Jointly owned by EASTMAN KODAK COMPANY and GENERAL MILLS, INC.

ROCHESTER, N. Y.

Once considered heavy, fragile, costly, expensive to ship... glass containers today are light in weight, tough, economical, competitive on freight rates. Improved design and manufacturing techniques make the modern glass container up to 37% lighter and so strong that it will resist unusually rough handling conditions. Automatic machinery and standardization now bring you a glass package that in some cases costs even less than other type containers. And today, your product packed in glass receives full freight parity with can-packed goods. Add the show window advantages of glass containers to their non-critical status, and you have today's most logical, practical, effective package.

S. R. NICHOLSON, known to his customers and friends as "Nick", is one of Anchor Hocking's ablest and most popular men, has a record of more than 16 years' service.

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ANCHOR HOCKING GLASS CORPORATION LANCASTER, OHIO

SPEED UP PRODUCTION FLOW

with

DAMROW

engineered

POWER or GRAVITY

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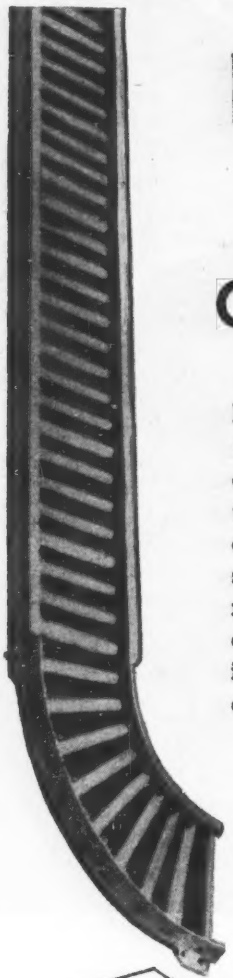

In the fast-flowing production lines of many Industries today you'll find the results of DAMROW engineering skill in moving materials faster . . . . Compact, efficient, smooth-working conveyor systems that save man-hours, make floor space pay higher dividends, streamline many processing operations for the quick delivery of "MORE—SOONER" that is our big job now.

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Is it moving products between operations—loading or unloading—floor to floor transfer—putting more production-flow in in limited space—assembly-line or packing-line "feeding"—continuous assembly conveying, DAMROW Engineers may offer a profitable solution to these and many other problems in YOUR plant. Write today!

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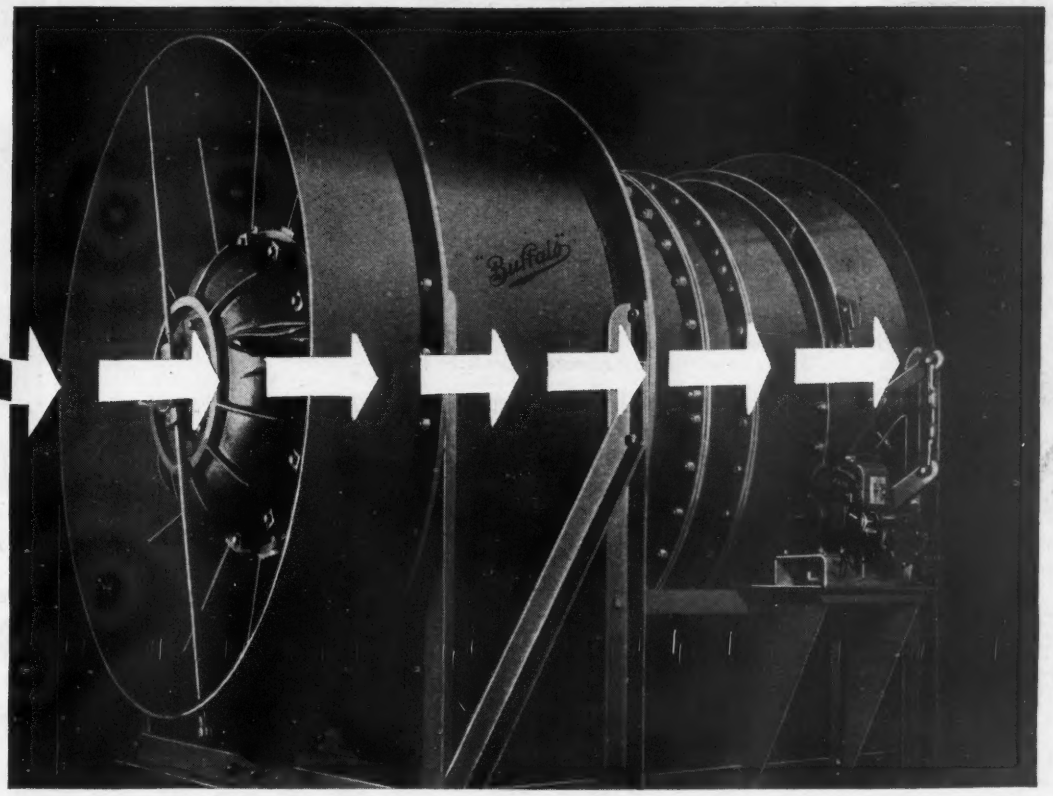
AIR TAKES THE *Straightaway*



In power-saving... "Buf-flow" AXIAL FLOW FANS

The "straightaway" flow of air through a "Buf-flow" Axial Flow Fan—plus the non-rotating movement of the air current as it leaves the outlet—explains both the efficiency and the power-saving features of this Buffalo-developed design. The wasted motion of air turbulence is reduced to a minimum by means of special directional guide vanes, thus preventing losses common in ordinary propeller fan. The result is an exceptionally high capacity operating against pressure losses, quieter operation, marked power savings. These advantages—plus the sturdy, durable construction and the non-overloading characteristic—makes "Buf-flow" Axial Flow Fans unexcelled for air handling problems.

Conserve
. . . your fan equipment. This new "Buffalo" booklet gives full, illustrated data on correct installation and maintenance of fans.
Write for your FREE copy

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BUFFALO FORGE COMPANY
152 MORTIMER ST. BUFFALO, N. Y.

Branch Engineering Offices in Principal Cities
Canadian Blower and Forge Co. Ltd., Kitchener, Ont.

"Buf-flow" AXIAL FLOW FANS

Wire Stitched Shipping Containers Best Protect Your Goods in Transit or in Storage

Bliss Heavy Duty Bottom Stitcher

Latham Bottom Stitcher

Regular Slotted Containers with bottoms wire stitched are widely recognized as the strongest, most rigid and dependable containers available. Wire stitching utilizes the entire strength of the board and is unaffected by moisture conditions in storage or transit.

For your stitching equipment, it will pay to you to investigate the machines illustrated here, before you buy.

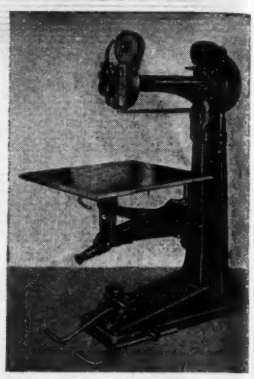
THE BLISS HEAVY DUTY BOTTOM STITCHER is recommended for heavy duty, high speed, continuous production. Favorably known as the fastest, strongest, most durable and dependable Bottom Stitcher built.

IMPROVED LATHAM BOTTOM STITCHER is a moderate priced machine, recommended for stitching the lighter grades of corrugated and solid fibre containers, in all the usual sizes which do not require the heaviest kind of stitching. Has many features heretofore found only in the highest priced machines.

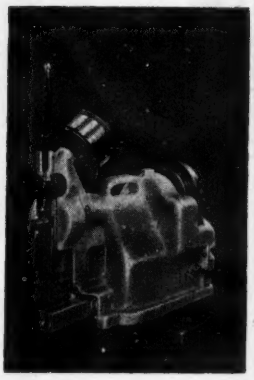
THE BLISS TOP AND BOTTOM STITCHER. Some products must now be shipped in completely wire stitched containers. This stitcher is recommended for plants or departments where one machine will handle the quantity of bottom and top stitching needed. Quickly changed for bottom or top stitching. Counterbalanced table for easy raising and lowering.

FOR STITCHING FILLED BAGS, the Boston Portable Bench Stitcher has been found practical and convenient, as it can be readily moved to the work to be stitched. Operates from light socket—solenoid operated foot pedal.

ASK FOR LITERATURE ON ANY OF THESE MACHINES



Bliss Top and Bottom Stitcher

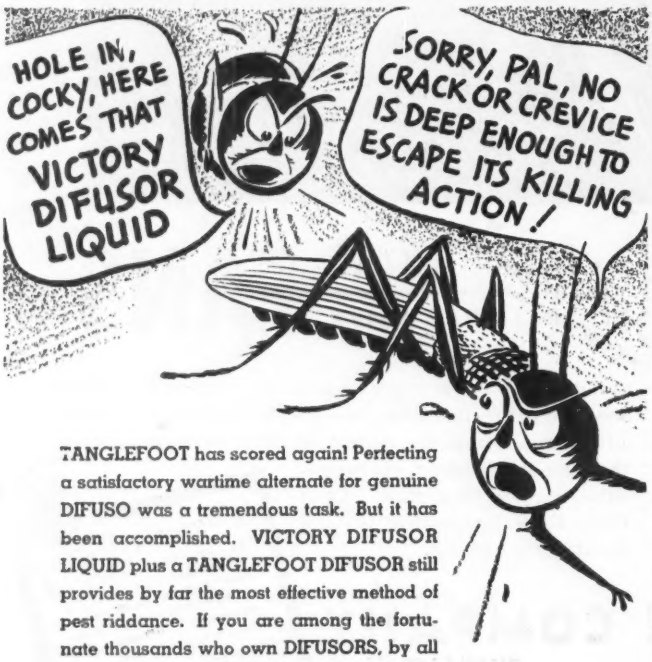


Boston Portable Small Bag Stitcher

DEXTER FOLDER COMPANY

330 West 42nd Street, New York

Chicago—Boston—Philadelphia—Cincinnati


HOLE IN, COCKY, HERE COMES THAT VICTORY DIFUSOR LIQUID
-SORRY, PAL, NO CRACK OR CREVICE IS DEEP ENOUGH TO ESCAPE ITS KILLING ACTION!

TANGLEFOOT has scored again! Perfecting a satisfactory wartime alternate for genuine DIFUSO was a tremendous task. But it has been accomplished. VICTORY DIFUSOR LIQUID plus a TANGLEFOOT DIFUSOR still provides by far the most effective method of pest riddance. If you are among the fortunate thousands who own DIFUSORS, by all means ask your dealer for

TANGLEFOOT VICTORY·DIFUSOR·LIQUID

THE ONLY ALTERNATE FOR GENUINE *DIFUSO* WHICH CAN BE SAFELY USED IN THE NOW IRREPLACEABLE *DIFUSORS*

THE TANGLEFOOT CO. • GRAND RAPIDS, MICH.

MERCOID

DA

double adjustment.

Temperature or Pressure

AUTOMATIC CONTROLS

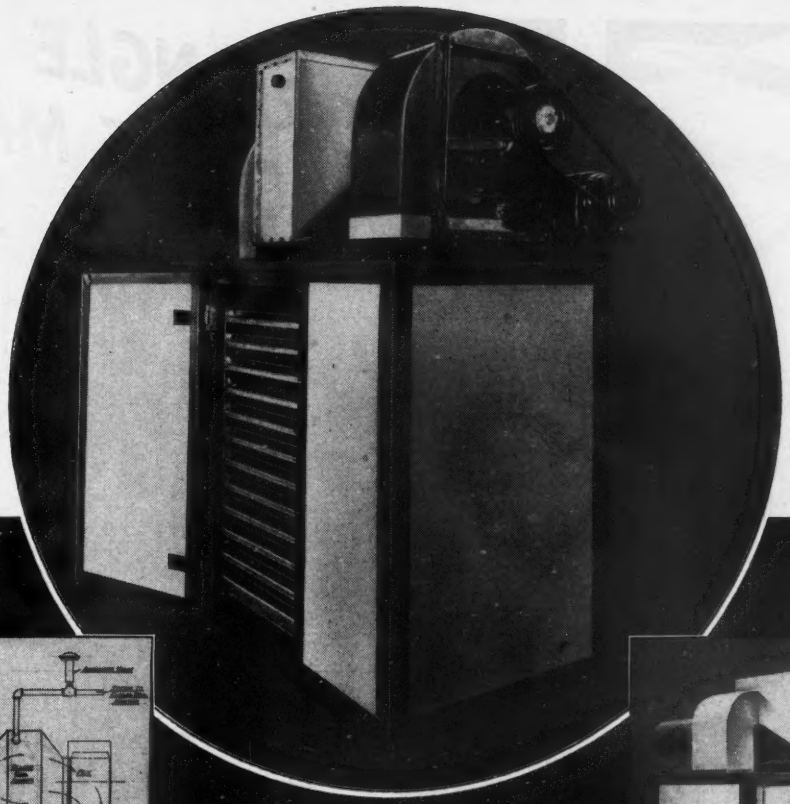
USED IN REFRIGERATION AND DEHYDRATION OF FOOD PROCESSING

Mercoid DA Controls have attained universal use throughout industry. They are adaptable to a wide range of applications and available in a variety of types to meet the demands for accurate control of temperature and pressure.

The distinctive features in Mercoid DA Controls are the corrosion and dust-proof mercury switch; the Bourdon tube actuating element, and the outside double adjustment, which makes it easy even for inexperienced workers to set the operating range of these controls. The direct reading eliminates calculations.

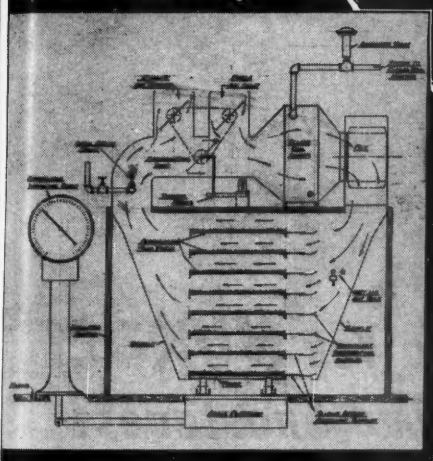
Complete information in catalog No. 600. Write for a copy.

THE MERCOID CORPORATION, 4203 W. Belmont Ave., Chicago, Ill.

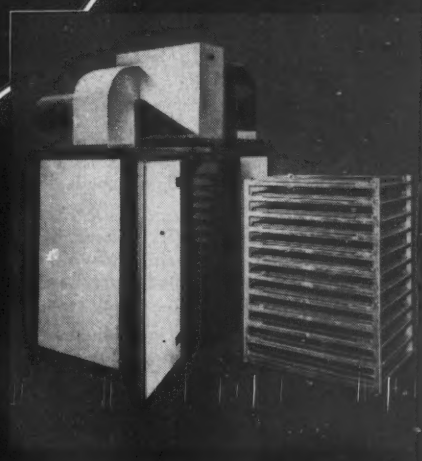


Unit for a New England packer of chowders, fish cakes, etc.

Cross section showing movable air ducts meshing with sides of trucks.



Showing truck ready to roll into chamber.



The Fleet Line

Something New and Better in DEHYDRATION!

THIS MACHINE is the first in a line of dehydration equipment which is being developed by our engineers. It reflects in its efficiency our many years of drying experience in other industries and the intensive research which we have more recently conducted in the food industry.

The cabinet type of machine shown here, made with capacities from 100 to 2000 lbs., provides a maximum flexibility. It is suitable for dehydrating fish chowder, clam chowder, ready-to-fry cod fish cakes, and many kinds of vegetables and meats in sliced, cube or string form. Changes in drying time or other operating conditions do not disrupt its production.

Food is placed on perforated trays in trucks, which roll into the dehydrating chamber on depressed tracks. Trucks fit flush against the back wall, and the front door and mesh on the sides with movable air ducts. Thus the air can not short circuit. It MUST pass over the food between the trays.

Drying time, temperature and humidity are automatically controlled in any combination desired. Circulating fans are variable speed to control volume of air.

Further information on request.

FOOT OF SUFFOLK STREET

RIGGS AND LOMBARD INCORPORATED

LOWELL, MASS.

THREE DIFFERENT DIRECTIONS

Since the outbreak of war, increased change in the production pace of the food industry has demanded rapid and economical equipment conversion.

That is why manufacturers rely on KOVEN'S efficient cooperation in helping them to serve reliably the American armed forces as well as the American people and our allies.

KOVEN helps build new, individualized equipment rapidly, speeding up production output.

The vast staff of KOVEN engineers will be pleased to design and fabricate equipment built to meet your own specific needs, as they have already done so expertly for leading food manufacturers.

Consultation with a KOVEN representative regarding your equipment problems obligates you in no way. Write or telephone KOVEN now.

Among the many KOVEN products:

- Stainless Steel
- Aluminum Sheet Fabrication
- Boxes, Tote, Waste Cans
- Chemical Apparatus
- Coils and Pipe Bands
- Copper Sheet Fabrication
- Galvanizing Work
- Mixers, All Kinds
- Monel Metal Fabricator
- Pails, Special Heavy
- Pans, All Types, All Metals
- Sinks, Sullery and Factory
- Tables, Galvanized or Monel
- Tanks, All Types, All Metals
- Kettles, All Types, All Metals

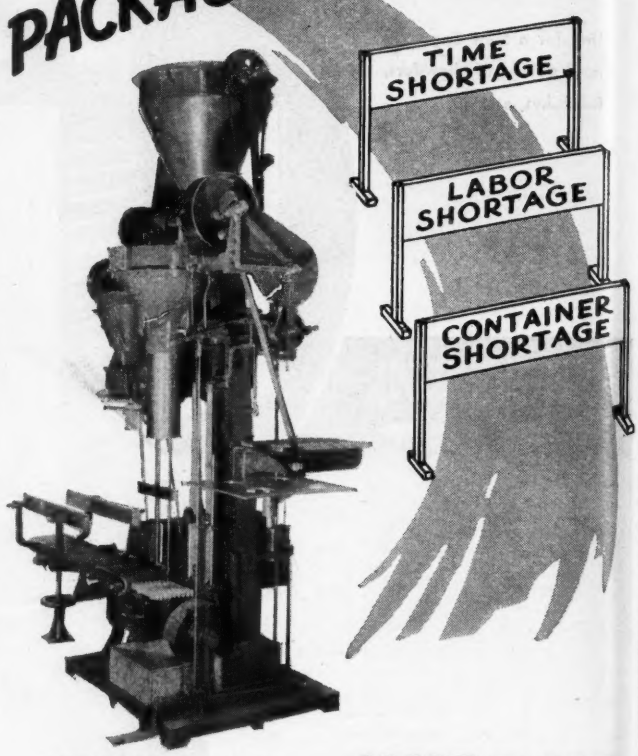
WATERFILM Industrial Heating Boilers

PLANTS:
Jersey City, N. J. Dover, N. J.

L. O. KOVEN & BRO. INC.

154 Ogden Ave.
Jersey City, N. J.

TRIANGLE PACKAGE MACHINERY



Will Help You HURDLE Wartime Shortages!

TRIANGLE Package Machinery will aid you and aid the war effort in the following ways:

1. Make possible changeover from containers made of critical materials to cartons and bags.

2. Save labor to meet the manpower shortage. As much as 60% and more labor saving reported by Triangle users.

3. Save time—you deliver the goods sooner.

4. Increase production—more output, often in less space.

A complete line of Weighers, Fillers, Carton Sealers.

Write today for literature and data on machines to handle your job.

ARMY E NAVY

TRIANGLE PACKAGE MACHINERY CO.

922 NO. SPAULDING AVENUE. CHICAGO

LUBRIPLATE SAVES 3 WAYS

1 **REDUCES FRICTION, WEAR AND POWER CONSUMPTION**

LUBRIPLATE maintains a wear-resisting, load-bearing film on shafts, bearings, gear teeth and other contacting moving machine parts. Tests prove that LUBRIPLATE actually arrests progressive wear.

2 **PROTECTS MACHINES FROM RUST AND CORROSION**

LUBRIPLATE protects machine parts against rust and corrosion even in the presence of many destructive food acids. Hot "clean-up" water doesn't wash LUBRIPLATE out of bearings. LUBRIPLATE is a safe lubricant. It is white and clean.

3 **MORE ECONOMICAL THAN ORDINARY LUBRICANTS**

A little LUBRIPLATE goes a long way. It stays put. Thousands of users have adopted LUBRIPLATE because it gives better, safer and cheaper lubrication—lowers upkeep costs—reduces power consumption and insures continuous operation.

THE PERFECT "ALL AROUND" LUBRICANT FOR THE FOOD INDUSTRY

LUBRIPLATE DIVISION

FISKE BROTHERS REFINING COMPANY

NEWARK, N. J. **SINCE 1870** TOLEDO, O.

WRITE FOR THE NAME OF THE DEALER NEAR YOU

THE NEW O&S *Steam Generating Unit*

Has More Than a Half Century of Boiler Engineering Behind it!

● Sturdy, compact, lightweight — this fully-automatic unit gives you exceptionally speedy steam production. It develops 100 lbs. pressure from 60° water in 18 minutes — or less! Back to this highly efficient unit is 58 years' experience in boiler engineering and manufacture.

Right now, the new unit is tagged "For Uncle Sam"... and some for plants with an AA2 or better. But you will want to investigate now — for the day when Victory makes O & S boilers again available for all purposes.

ORR & SEMBOWER INC. O&S *Builders of Better Boilers Since 1885*

READING • PENNSYLVANIA

THE PERFECT PACKAGE...

"Glass" with Filma-Seal

The Gutmann screw cap and inner Filma-Seal are applied together in one operation.

Filma-Seal

√ tamper-proof
√ leak-proof
√ evaporation-proof
√ moisture-proof
√ dustproof

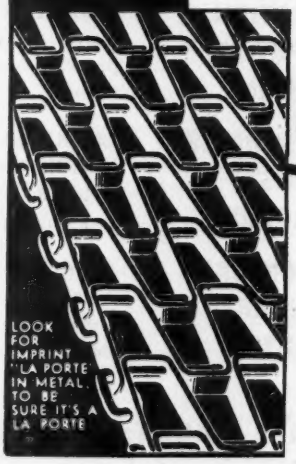
(Reg U.S.Pat.Off.)

FERDINAND Gutmann & COMPANY SINCE 1890

3611 14th AVE., BROOKLYN, N. Y.

Keep VICTORY Food Products MOVING ON LA PORTE

FLEXIBLE STEEL CONVEYOR BELTING

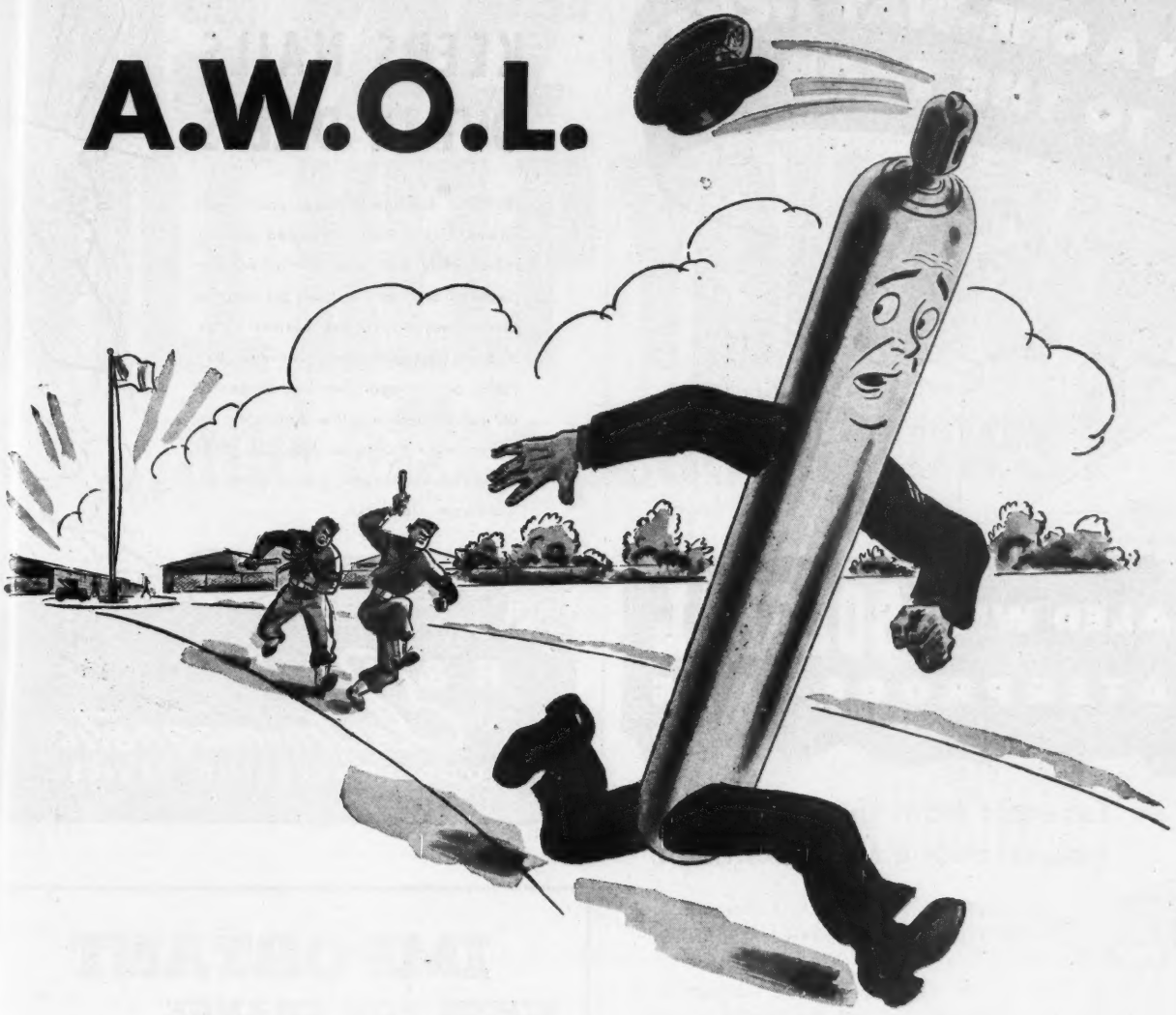


Every conveying operation in the processing of Cold Pack, Hot Pack, Sugar Preserved, Dehydrated and Smoked foods can be handled faster, better and cheaper with LA PORTE Conveyor Belting. It withstands all impacts at the loading chute. It resists heat and cold. It will not stretch, creep, weave, nor jump. It will not deteriorate while not in use. And, in addition, it requires no dressing or special maintenance to keep it at top efficiency. Easily sterilized with a steam gun or scalding water right on the friction drum.

Ask your Supplier TODAY for LA PORTE Conveyor Belting—in Galvanized Steel—available in any length and practically any width.

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

A.W.O.L.



SEND HIM BACK immediately to his post (Carney's Point, N. J.). You'll recognize him instantly—he's the empty "Freon" cylinder in your shop.

He's needed for war duty—to carry "Freon" to war production plants, to military bases, and to you in your job of servicing vital civilian needs.

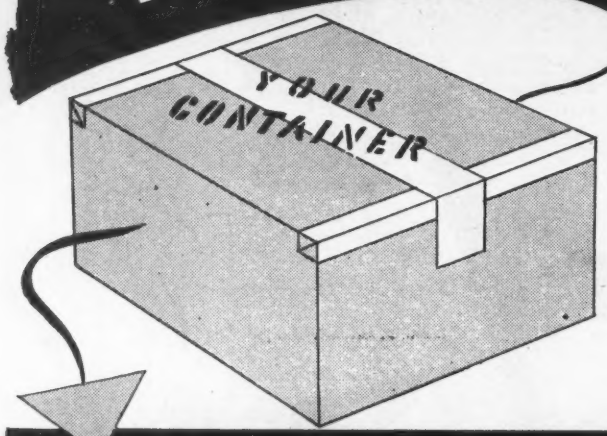
When you return him, be sure to include that brass cap that belongs on the valve. We can't get new caps for love or money—and a cylinder without one is almost as bad as no cylinder at all.

RETURN CYLINDERS THE INSTANT THEY ARE EMPTY

KINETIC CHEMICALS, INC., *MAKERS OF "FREON"* SAFE REFRIGERANTS*

**"Freon" is Kinetic's registered trade mark for its fluorine refrigerants*

ON A ONE-WAY TICKET TO THE TROPICS

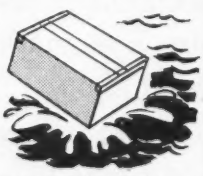


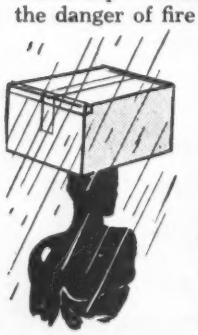
SEALED WITH SOLSEAL WATERPROOF TAPE

Excerpts from the diary of a tropics-bound food container

". . . and when it came to facing the elements, I'm here to tell you I *really* had to take it!

"It started when they stood me alongside the other containers on the freight platform (there just was no available warehouse space to keep us snug and dry), half-buried in mud, with rain pelting down on me for the better part of two weeks! . . . Then the loading dock . . . more rain and sleet, enough to make me want to fall apart from waterlogging, but I held up under it in great shape. Once on the ship I was set down in the hold, partially under water the entire trip . . . water in the hold minimizing the danger of fire under torpedo attacks.





"When I finally arrived at port of destination we didn't dock. To speed things along I was dumped into the ocean to be picked up at low tide . . . after which I was toted right up to advance positions through pelting tropical rains. You'd think that long before that I'd have burst my seams! . . . Not a bit of it. I was sealed with SOLSEAL Tape so that we could stand rain, high humidity and immersion *for weeks at a time!* And did I come through with colors flying? I'll say I did—and how!

SOLSEAL Waterproof Tape is available in 30/30/30, 60/30/30, and 60 lb. Wet Strength Kraft with Solseal adhesive. Also available string filled for use as a strapping tape. Manufacturers whose containers are subject to high humidity, rain and actual immersion are urged to write for free sample coil with Solseal Solvent for testing purposes. Specify type of Solseal sample desired.

A McLAURIN-JONES Product

McLAURIN-JONES COMPANY · BROOKFIELD · MASS

KEEPS NAILS OUT OF DICERS

PREVENT damage to dicers, costly shutdowns. Crate nails, dropped cutting knives, stray nuts, bolts, bits of wire or pieces of steel or iron can't get into the dicers and wreck the cutters if an H & H Electro-Magnetic Conveyor Belt Pulley or Conveyor Belt Line Magnet is on guard. Positive action. Automatic. Inexpensive. • Plastiform Mfg. Co., 3151 Los Feliz Boulevard, Los Angeles 26, California. Dept. FI8.

H & H *Electro-magnetic*
FOOD PROCESSING DEVICES

IMPORTANT

WHEN YOU CHANGE YOUR ADDRESS . . .

Unlike first-class mail, periodicals are not forwarded to a new address unless the subscriber pays the additional postage.

You can avoid this annoyance—and receive your copies of FOOD INDUSTRIES promptly upon publication, by advising us of any change of address at your earliest convenience.

NAME .....

NEW HOME ADDRESS.....

CITY & STATE.....

PRESENT POSITION.....

COMPANY .....

OLD ADDRESS.....

CITY & STATE.....

FOOD INDUSTRIES
330 West 42 Street New York, N. Y.

THIS *FREE* BOOKLET WILL HELP YOU *NOW*

...and after peace comes!

Here are the facts to help you picture *your* part in our all-out war effort and in Tomorrow's transportation when peace comes.

LOGISTICS means "getting the right men and the right materials to the right place at the right time"—and that's *your* business today and tomorrow.

A truck-trailer loading in Cleveland or Des Moines is part of the strategy of Victory. "Too little, too late" is being erased by well-planned transport. And all this has a bearing on *your* future. The peacetime expansion of the United States will depend upon a highly integrated, closely allied transportation system. The men who will develop this system—you and your co-workers—will look to the "Logistics" of World War II as a guide.

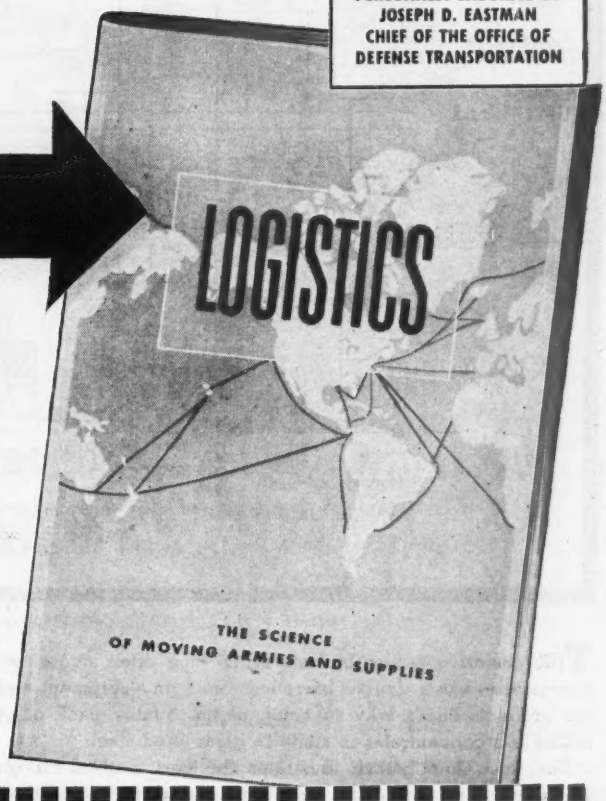
Whatever your job may be in transportation, write for this booklet today. It will help you understand the whole transportation side of the war picture—and where you fit in. And it will help you make a greater contribution to transportation expansion when the war is over. Send for it NOW! It's FREE!

ARMY E NAVY

TRAILMOBILE

COMMERCIAL TRAILERS FOR WAR AND PEACE

PERSONALLY ENDORSED BY JOSEPH D. EASTMAN CHIEF OF THE OFFICE OF DEFENSE TRANSPORTATION



THE TRAILER COMPANY OF AMERICA

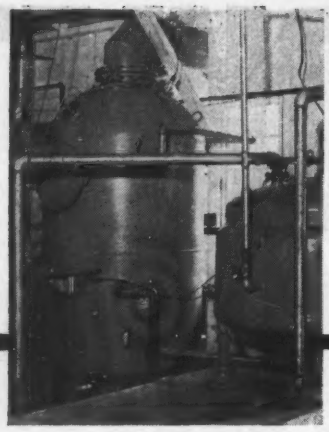
Cincinnati, Ohio Branches in Principal Cities

ATTENTION! ALL TRANSPORTATION MEN! See how your job is part of the greatest transportation system ever conceived. Send for your *free* copy of "Logistics —the Science of Moving Armies and Supplies."

Name _____

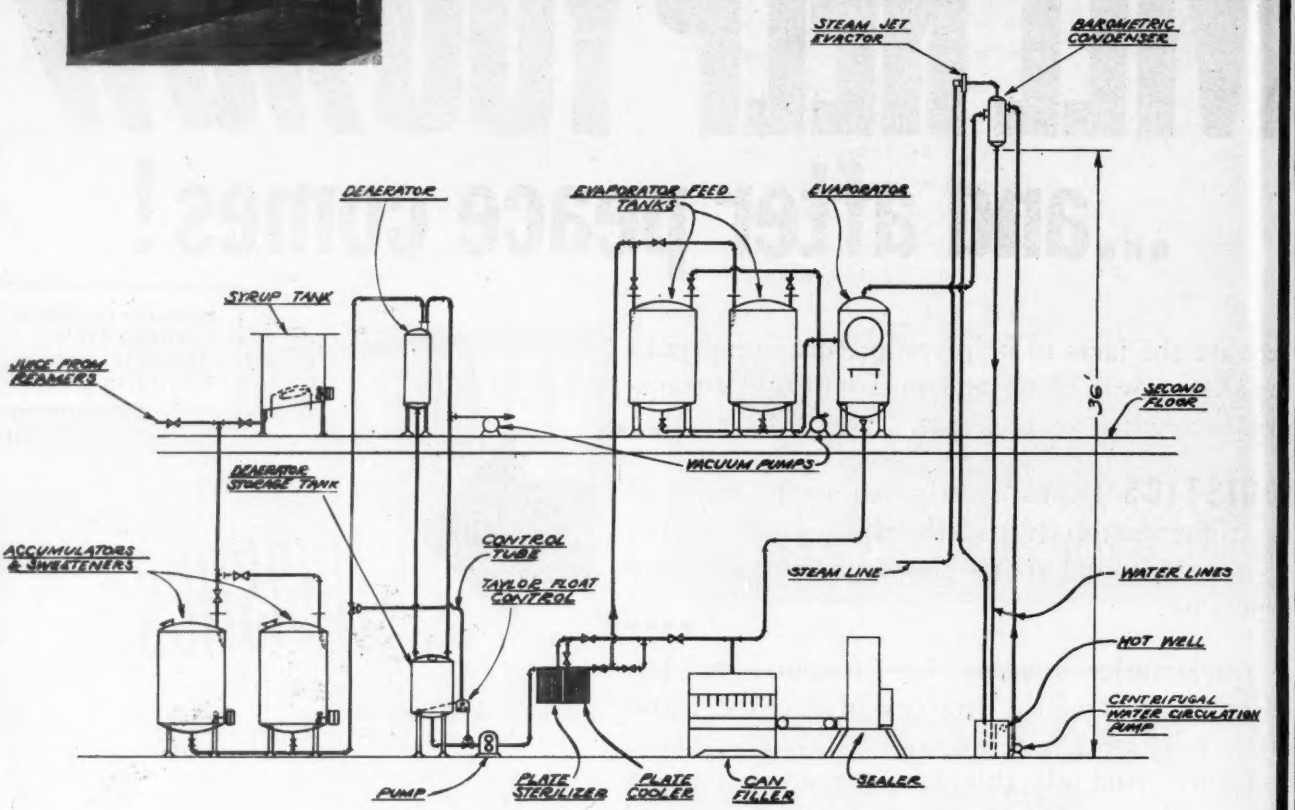
Company _____

Address _____



To protect Citrus concentrates quality

PROCESS IN GLASS . . .



FLOW DIAGRAM
FOR CITRUS JUICE AND CONCENTRATE

THE corrosive action of fruit acids—too often neglected by processors—has a double barrelled effect on equipment and on the product. That's why so much of the quality pack of citrus juices and concentrates is made in glass-lined steel.

The flow sheet above illustrates the best method for giving complete protection to the juice from reamer to filler. The juice from the reamers is mixed with the syrup from the glass-lined syrup heating and mixing tank and passes to the glass-lined accumulators and sweetners. It is next pumped to the glass-lined deaerator where entrained air is removed—an important step in quality production. This improves quality and reduces spoilage. The product is next passed through a plate sterilizer where it is flash pasteurized and then passes through glass-lined evaporator feed tanks into the glass-lined steel evaporator or vacuum pan. This unit may be either of the batch type or the continuous type, although the latter is recommended chiefly for large scale operation. From the vacuum pan the product passes directly to the fillers.

Such a line protects quality from start to finish. Wherever the citrus juice remains or is liable to remain for more than a few minutes—glass enamel separates the corrosive contents from the metal walls. Dearation has proved itself by a record of improved quality and better keeping. Plate pasteurization protects quality and vacuum processing maintains original color and flavor to a marked degree.

Such a line-up has additional advantages such as greater ease of cleaning and hence lower labor costs—lower depreciation, due to longer life—plus the advantages of Pfaudler Engineering. Your prompt inquiry will enable us to help you work out the best solution to your processing problems.

PFAUDLER

THE PFAUDLER CO., Rochester 4, N. Y. Branch Offices: 330 West 42nd St., New York 18, N. Y.; 1442 Conway Bldg., Chicago 2, Ill.; 1325 Howard St., San Francisco 3, Calif.; 344 Paul Brown Bldg., St. Louis, Mo.; 7310 Woodward Ave., Detroit 2, Mich.; 1318-1st Nat'l. Bank Bldg., Cincinnati 2, O.; 1228 Commercial Trs. Bldg., Philadelphia 2, Pa.; 751 Little Bldg., Boston 16, Mass., 1034 Washtington Bldg., Washington 5, D. C.

"What, another ruling?"

The best way to survive these days, is to refuse to do any worrying that you can hand to someone else. For instance, you can relieve your mind of all refrigeration problems the moment you sign a York Maintenance Contract.

From that moment, the maintenance of your plant is our headache. We take care of priorities and paper work required to keep your plant operating continuously and efficiently. We see to it that you get needed renewal parts *before* a breakdown occurs, that you have refrigerant, motors, belts, fittings, and oil as needed. And, as an immediate dividend, we see to it that your plant is at prime efficiency, giving you savings in power and water costs.

In these times you cannot afford to ignore this complete, scientific service. Where refrigeration is vital, the monthly fee is trifling.

The coupon will bring you complete information. Send it today. York Ice Machinery Corporation, York, Pennsylvania.

YORK REFRIGERATION AND AIR CONDITIONING FOR WAR

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

York refrigeration air conditioning — Certified MAINTENANCE

YORK ICE MACHINERY CORP., YORK, PENNA. HM-7

I am interested in learning more about the York Certified Maintenance Contract.

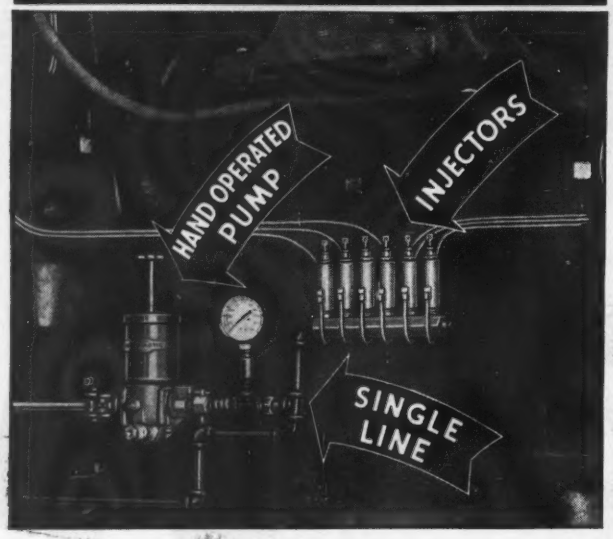
Name_____ Position_____

Co. Name_____

Street & No._____

City_____ State_____

Do Your Part To Keep Up Production Of Foodstuffs Needed To Win This War



Avoid machine shut-downs caused by bearing failures

★

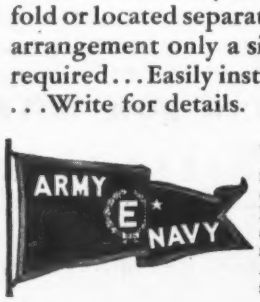
Equip your machines with

LINCOLN

CENTRO-MATIC LUBRICATING EQUIPMENT

The Lincoln method of modern lubrication provides a simple, practical means of delivering lubricant to all bearings of a machine, or group of machines, from a central source—without stopping machines.

A Centro-Matic System consists of a number of Centro-Matic Injectors—one for each bearing—and a power operated or a hand operated Centro-Matic Lubricant Pump. A power operated system can be either time clock control or push button control... The injectors can be grouped in manifold or located separately at each bearing. In either arrangement only a single lubricant supply line is required... Easily installed on new or old machines ...Write for details.

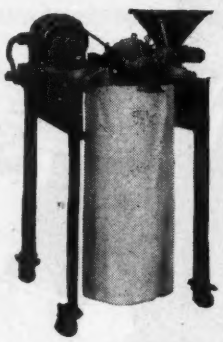


The ARMY-NAVY PRODUCTION AWARD for high achievement in the production of war equipment, conferred upon the Lincoln Engineering Company has had a star added. This star symbolizes 6 more months of exacting service to our Armed Forces, delivering vital materials so necessary for ultimate Victory.

143-29

LINCOLN ENGINEERING COMPANY
PIONEER BUILDERS OF LUBRICATING EQUIPMENT
ST. LOUIS, MO.

MORE THAN 1000 MATERIALS TESTED



In 20 years, our laboratories have made 17,000 test runs covering the grinding of more than 1000 different materials in Mikro-Pulverizers. We have amassed a fund of information valuable to processors needing pulverizing machinery. Submit your material for free test grind or check with our laboratories for records of tests made on materials similar to your own.

CHECK THESE ADVANTAGES

Dustless—no fans, cyclones, separators.

For Dry, Wet Milling or Granulating.

Saves in power—saves floor space—worked with unskilled labor.

Low operating cost—Fineness up to 99.9% through 325 mesh.

Send today for 32 page catalog.

PULVERIZING MACHINERY COMPANY
97 Chatham Road • Summit, New Jersey

Produce OXYGEN and HYDROGEN .. SAFELY

by BURDETT ELECTROLIC OPEN-CELL PROCESS

The Burdett Electrolytic Cell is a closed cell operating in an open steel tank of electrolyte. This design feature makes it possible to immediately detect leakage which is not possible in other standard cells. Gases cannot accumulate to cause explosion hazard. These cells have been proved to be particularly desirable where uncontaminated gases are of advantage — producing oxygen approximately 99.7% pure and hydrogen 99.85% pure. Deterioration of equipment over a long period is negligible. Economical! Reliable!

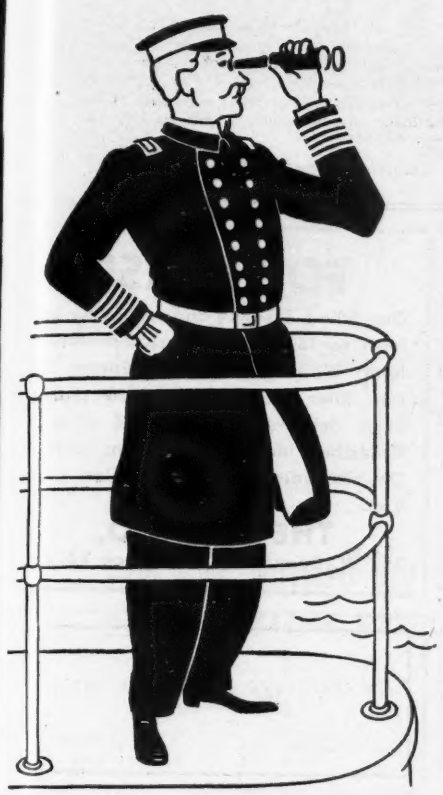
Request complete information

22 N. Loomis Street, Chicago, Illinois

BURDETT MANUFACTURING CO.
Oxygen-Hydrogen Generators

"You may fire when ready, Gridley"

...THUS SPOKE ADMIRAL DEWEY AT THE FIRST BATTLE OF MANILLA...



And fire he did . . . with such telling effect that in a short space of time thereafter the Spanish relinquished their control of the Philippines.

Today, the Philippines are again in other hands because we, as a nation, were caught napping. Sure we'll get them back . . . but think of the cost because we were not prepared when the fight was forced on us.

One of these days fighting will be over and back to peacetime competition we will go. Are you prepared to meet that time? Will your equipment be in shape and adequate to meet the changed world conditions? Or are you going to lose your opportunity to produce a better product at less cost because you, too, were caught napping?

Now is the time to prepare for that day—not when the war is over and everybody will be wanting new and improved equipment.

Our engineers are ready to discuss your future problems with you. We have worked out some new ideas that will make Hottmann mixing equipment better than it has ever been.

Orders will be filled when the war is over in the order in which they are received now.

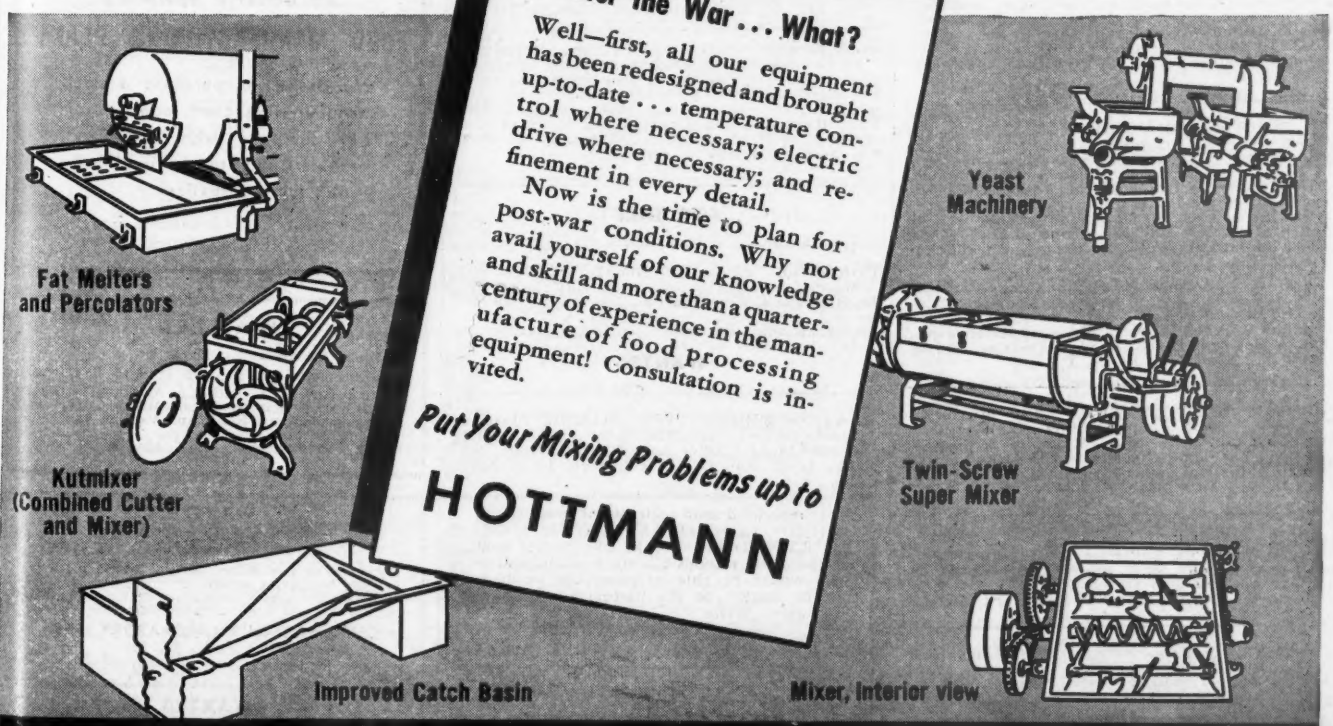
After the War... What?

Well—first, all our equipment has been redesigned and brought up-to-date . . . temperature control where necessary; electric drive where necessary; and refinement in every detail.

Now is the time to plan for post-war conditions. Why not avail yourself of our knowledge and skill and more than a quarter-century of experience in the manufacture of food processing equipment! Consultation is invited.

Put Your Mixing Problems up to

HOTTMANN



THE HOTTMANN MACHINE COMPANY

3325-47 East Allen Street • Philadelphia, Penna.

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:
10 cents a word, minimum charge $2.00. (See ¶ on Box Numbers.)
POSITIONS WANTED (full or part-time individual salaried employment only), ½ above rates.
PROPOSALS, 50 cents a line an insertion.

INFORMATION:
BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.
DISCOUNT of 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:
The advertising rate is $6.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. F.I.

NEW ADVERTISEMENTS received by 10 A. M. August 19th will appear in the September issue, subject to limitations of space available

FOOD BACTERIOLOGIST WANTED

A large midwestern food industry is seeking a food bacteriologist to do research on problems attending the production and control of the processing of foods. Permanent position. Salary commensurate with training and experience.

P-177, Food Industries
520 No. Michigan Ave., Chicago 11, Ill.

POSITIONS VACANT

WANTED: EXPERIENCED MAN in essential vegetable cannery located in Wisconsin. Permanent job, plenty of opportunities for advancement and expression of personal ideas. Knowledge of Chemistry, bacteriology and canning procedure essential. Man to have charge of Research Laboratory. Write giving experience, age, salary expected and draft status. All information confidential. P-162, Food Industries, 520 N. Michigan Ave., Chicago 11, Ill.

EXPERIENCED EXECUTIVE to manage and operate a Large Company engaged in the Sauerkraut and Pickle business. This Company operates plants in the South, North, and Mid-West. It grows its pickles and vegetables under contract, also cures, processes, and packs its product. Anyone interested is requested to enclose in a letter his name, age, experience, and other qualifications, and mail to P. O. Box 93, Landsdowne, Pa.

CHEMICAL ENGINEER or Food Technologist for research and development in dehydration. Graduate work in bacteriology or biochemistry desirable but not essential. Location, Midwest. Please send complete details as to training, qualifications, experience, draft status, salary, etc., in first letter. Enclose recent photo. P-167, Food Industries, 520 N. Michigan Ave., Chicago 11, Ill.

FOOD MICROBIOLOGIST or Technologist for research with prominent concern in northern middlewest. Graduate bacteriological training or experience most desirable. Biochemical training also desirable but not essential. Please send complete details as to training, qualifications, experience, draft status, salary, etc. in the first letter. Enclose recent photo. P-168, Food industries, 520 N. Michigan Ave., Chicago 11, Ill.

WANTED Foreman dry fertilizer mixing plant Atlantic Coast. Write experience and salary desired. P-169, Food Industries, 330 W. 42nd St., New York 18, N. Y.

PRODUCTION MANAGER. Fully conversant with all food problems from manufacturing and packaging angles. Must be willing to travel. State age, experience and salary. P-178, Food Industries, 330 W. 42nd St., New York 18, N. Y.

FOOD CHEMIST. Complete knowledge of food products covering fruit, sugar, farinaceous goods, etc. State age, experience, salary and whether free to travel. P-179, Food Industries, 330 W. 42nd St., New York 18, N. Y.

WANTED experienced installation mechanic for packaging machinery. Give all details in first letter. Address P-172, Food Industries, 520 N. Michigan Ave., Chicago 11, Ill.

POSITIONS WANTED

IMAGINATIVE TYPE SALESMAN with exceptional talent seeks change to Dehydration field. Can furnish proof of excellent sales promotion record. PW-170, Food Industries, 330 W. 42nd St., New York 18, N. Y.

WANTED

RESEARCH DIRECTOR

Large progressive middle west soybean plant has opening for man of exceptional ability, proven experience and initiative to direct intensive research program for new product development, mainly foods. Excellent opportunity in new essential field. Require high type individual with salary commensurate. Reply giving all details of training, experience, age, draft status, salary expected, etc.

P-176, Food Industries
520 North Michigan Ave., Chicago 11, Ill.

POSITIONS WANTED

EXECUTIVE SITUATION WANTED. A connection with reliable food organization interested in responsible representation in Detroit and Michigan area calling on the Bakery, Ice Cream and Restaurant trade for 20 years. Excellent background of practical experience in purchasing and processing Frozen Foods. PW-171, Food Industries, 330 W. 42nd St., New York 18, N. Y.

FOOD TECHNOLOGIST—Over ten years experience in the manufacture and chemistry of carborated beverages, canning, preserving, catsups, coffee, macaroni products, condiments. Draft classification 3A. PW-173, Food Industries, 520 N. Michigan Ave., Chicago 11, Ill.

BIOCHEMIST AND ANALYTICAL CHEMIST. Ph.D. desires responsible position in direction of research on foods and nutrition, or in the direction of large control laboratory. Administrative experience. Many publications. Past draft age. Only permanent Position considered. PW-175, Food Industries, 68 Post St., San Francisco 4, Cal.

FOR SALE

FOR SALE: Baker Bill Noodle Machine with Motors, practically new. Also Buffalo Blower, Dayton Food Products Co., Dayton 10, Ohio.

WANTED

M & S PLUNGER TYPE FILLER, Stainless Steel, perfect condition, later model. Write particulars and price to Claridge Food Company, 41-23 Murray St., Flushing, L. I., N. Y.

Life long food and agricultural chemist has a HIGH COMMERCIAL VALUE FOOD CONCENTRATE—Would like to get connected with responsible food manufacturer who would be able to place the products on the market on the partnership basis or otherwise. Write

BO-181, Food Industries
520 No. Michigan Ave., Chicago 11, Ill.

Don't forget the
BOX NUMBER . . .

When answering the classified advertisements in this magazine, don't forget to put the box number on your envelope. It's our only means of identifying the advertisement you are answering.

FOR LEASE

One filling, labeling and conveying line for 1 to 16 oz. bottles; semi-automatic filler; World labeler. One Sperry 18" iron filter press, 18 recessed plates, open delivery. One No. 4 Clipper Emulsifier, jacketed, AC motor driven. One Triangle dry powder filler, 1 to 6 oz.

THE JULEP CO.
353 W. Grand Ave. Chicago 10, Ill.

WANTED

WANTED
an actively operating
FOOD MANUFACTURING PLANT

We desire to purchase a food manufacturing plant, now operating, complete with equipment, machinery and organization. Please furnish full information.

W-180, Food Industries
330 W. 42 St., New York 18, N. Y.

WANTED

2—Tablet Machines; 3—Filters.
2—Dry Powder Mixers, with or without Sifters.
2—Rotex Screens; 1—Packaging Machine; 1—Glass Lined Kettle; Stainless Steel, Monel, Copper or Aluminum Jacketed Kettle and Vacuum Pan.

W-132, Food Industries, 330 W. 42nd St., N. Y. C.

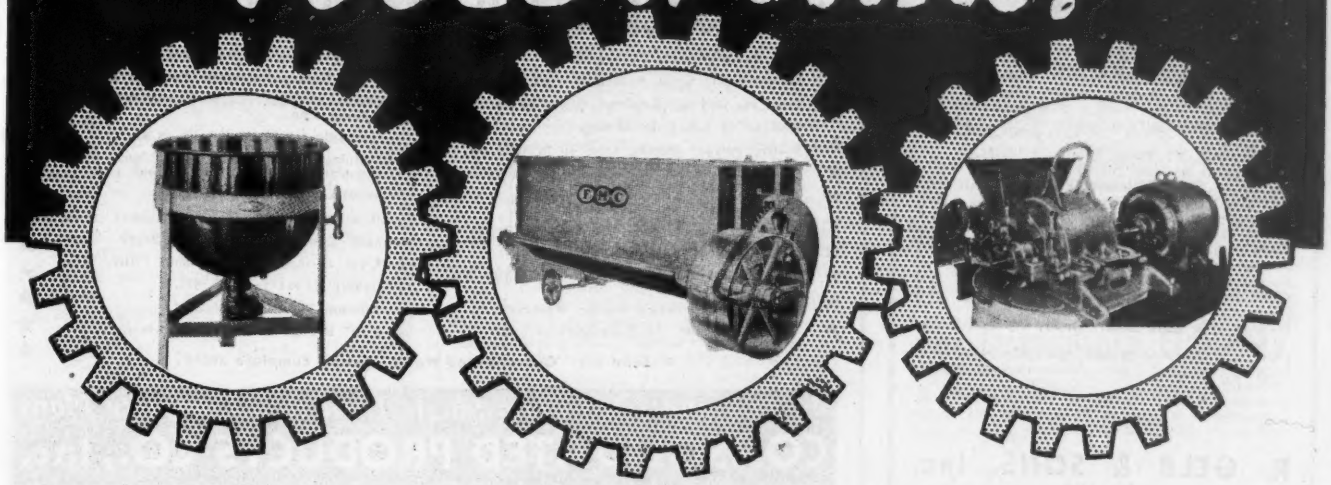
WANTED
MIXER

Motor-driven Dry Mixer, 500 to 750 lb. capacity, suitable for mixing several dry ingredients in food manufacture. Center discharge. Motor to operate on 220 volt, 60 cycle, 3 phase current. Write:

CHR. HANSEN'S LABORATORY, INC.
Little Falls, N. Y.

WANTED
Buflovak Vacuum Drum Dryer
Size #1, drum size 20" or 24" or equivalent size of some other make.
Peter Cailler Kohler Swiss Choc. Co., Inc.
555 South Fourth St. Fulton, New York

Food Equipment is important among the TOOLS of WAR!



WE ARE PROUD OF OUR RECORD IN REALLOCATING EQUIPMENT TO KEEP PRODUCTION ROLLING IN THE WAR EFFORT. CHECK WITH F. M. C.

NEW AND RE-NEWED PORTABLE AGITATORS

106—New and Rebuilt Portable Agitators; from ¼ HP to 5 HP, AC or DC, with geared head, slow speed or high speed motors.

BLOWERS

12—Champion, Beach, Russ, Connersville, Acme, Roots, Buffalo Blowers; up to 1800 CFM.

COLLOID MILLS

1—Eppenbach, Horizontal, Colloid Mill; 1800 RPM, 10 to 75 gal. per hour.
1—Charlotte Colloid, 6" rotary, 20-100 gal. per hour.

CAPPERS

15—Semi and fully Automatic, single head, 4 head, and 6 head Cappers; by Pneumatic Scale, Capem, Haskin, Elgin and others.

DRYERS

1—Devine Rotary, Vacuum Dryer; 3' dia. x 25' L.
2—Louisville Tubular Dryers; 6' x 35', arranged for motor drive.
1—Dryer; Steam Heated, Gehnrich Festoon Type, 5'6" W. x 20'6" L.
1—Drum Dryer; J. P. Devine, vacuum type 2' x 2'.
2—J. P. Devine, Rotary Vacuum Dryers; 5' x 30'.
1—Gas Dryer; 41" deep, 110" high, 54" wide, with 2 gas burners.
1—Gehnrich Gas Heated Dryer; 4'6" W. x 6' dia. x 7' H., complete with truck.
1—Bartlett-Snow, Horizontal, Sheet Steel Digester; 6' dia. x 18' L., dished heads.

LIQUID FILLERS—Vacuum & Gravity

12—Kiefer, U. S., Fowler, Haller, Louisville, 6 spout to 18 spout, semi and fully automatic, gravity Fillers.
1—Standard Automatic, 12 spout, Vacuum Filling Machine.
2—Standard Automatic, 12 & 15 spout, Vacuum Fillers.
12—Pneumatic, Standard Automatic, Alsop, International, Lehman, Fowler, Kiefer Vacuum Fillers—2 to 16 spout.
1—Samco Jr. Vacuum Filler.

POWDER FILLERS

1—Natl. Packaging Mach. Co., 2 Station, model K, type M, Powder Filler.
1—Pneumatic Scale, Rotary, Powder Filler.
2—Pneumatic Scale bulk weight Fillers, straight line and circular types.
8—Powder Fillers; Kiefer, Day, Gump, Heepner, Edtbouer, Scott—semi and fully automatic.

PRESSURE FILLERS—Cans & Jars

1—Special, 4 piston, Jktd., Filler; Cast Iron Hopper, MD, bronze cylinder.
3—M & S, 4 to 6 spout Fillers.
15—Ayers, Hansen, National, Progressive Fillers: 4 to 10 spout, automatic.

FILTERS & FILTER PRESSES

30—Kiefer, Sietz, Furka, Loew, Valez, Schlangen Filters.
1—Kelly Filter 4' x 10' cylinder, 10 Frames, 5" centers.
1—Shriver 24" Wood Filterpress; 30 chambers.
1—42" Iron Sperry Filterpress; with 57 recessed plates.
1—Sperry 36" skeleton, Hydraulic close.

KETTLES

75—Copper, Steam Jktd. Kettles; from 20 to 750 gal., some with agitators.
57—Stainless Steel and Monel Kettles, from 5 gal. to 200 gal.
16—Iron & Steel Kettles, 20 gal. to 1000 gal.

LABELERS

6—Burt & Knapp Can Labelers; No. 1 to No. 10 can.
9—Semi and Fully Automatic Bottle and Jar Labelers; World, National, and Ermold, O & J, Weeks, etc.

MILLS GRINDERS

2—Mikro No. 4 Pulverizers; 24", complete with motors.
9—Hammermills; Williams, Mead, F. M. C., some with dust collectors and screens.
17—Schutz O'Neill, Bauer, Munson, Sprout, Waldron, single runner and double runner Attrition Mills.
24—Other Disintegrators; cake breakers, crushers and similar equipment.
2—Noyes double roller Mills, with corrugated Rollers, 9"x24".
1—Wolf Roller Mill; 3 sets of rollers, 9" diam. x 30" L.

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7—Jktd. & Agitated Vacuum Stills or Cookers; 1000 gal.
4—Copper Vacuum Pans; Jktd. and Unjktd., up to 54" diam.
3—Copper, Jktd., Vacuum Stills; 60 gal. each.
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FILTER PRESSES—Wood

1—Shriver, 24" Filterpress; 30 chambers.
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22—New & Used Dry Mixers; from 50 lbs to 2000 lbs.
6—J. H. Day, Heavy Duty, Mass Mixers; from 30 gal. to 200 gal.
2—J. H. Day, Jktd., single arm Mixers; 200 gal. capacity.

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1—Package Machinery Co. Wrapper, wraps 9/16" cube, 30" intake conveyor, M.D.
4—Wrapping Machines; Package Machinery and others.
1—Standard Knapp, top and bottom Gluer and Sealer for cartons.
1—Jones No. 130 Carton Sealer.

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17—Rotary Pumps; Yale & Towne, Viking, Glover, Industrial, "Westco", New and Rebuilt of varying capacities, 5 to 200 RPM.
10—Centrifugal Pumps; Davis, Buffalo, Recco, Pennsylvania, Schneible, Gould, Burke—in iron and steel, 10 to 1000 RPM.
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1—Worthington, horizontal, Duplex Pump; ¾" x 4".
1—Worthington, 9 x 8½ x 10, Wet, Vacuum Pump.
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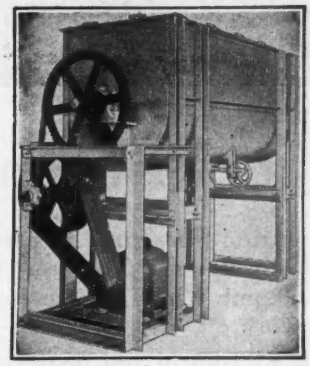

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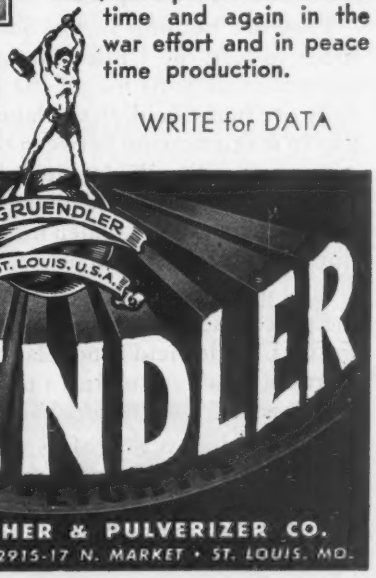

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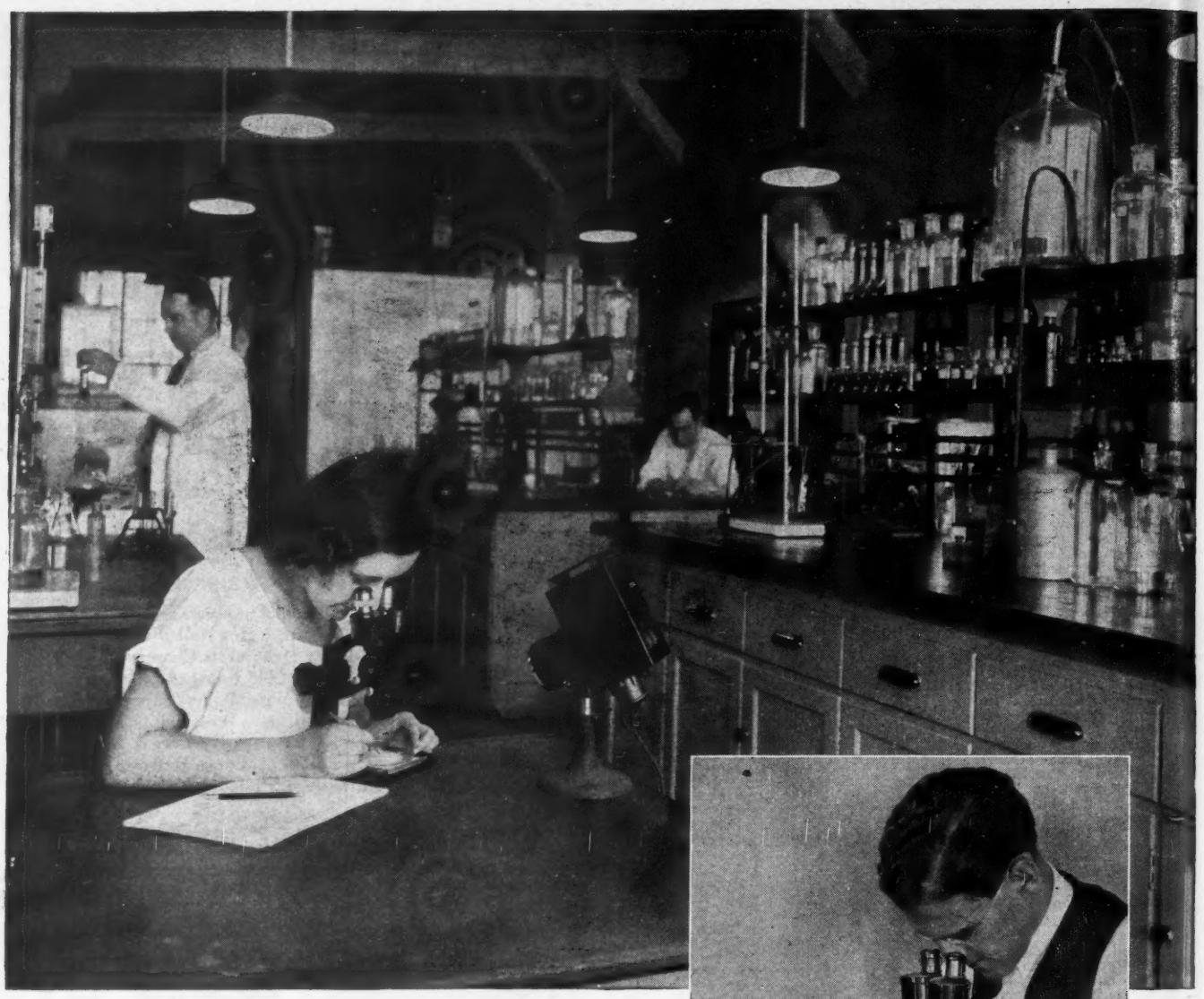

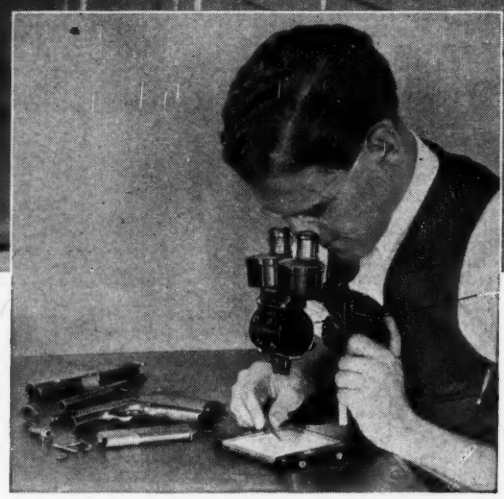

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All along America's war production line, from its start with the raw materials in the field, through the laboratory to the final vital inspections, Bausch & Lomb Wide Field Stereoscopic Binocular Microscopes are at work.

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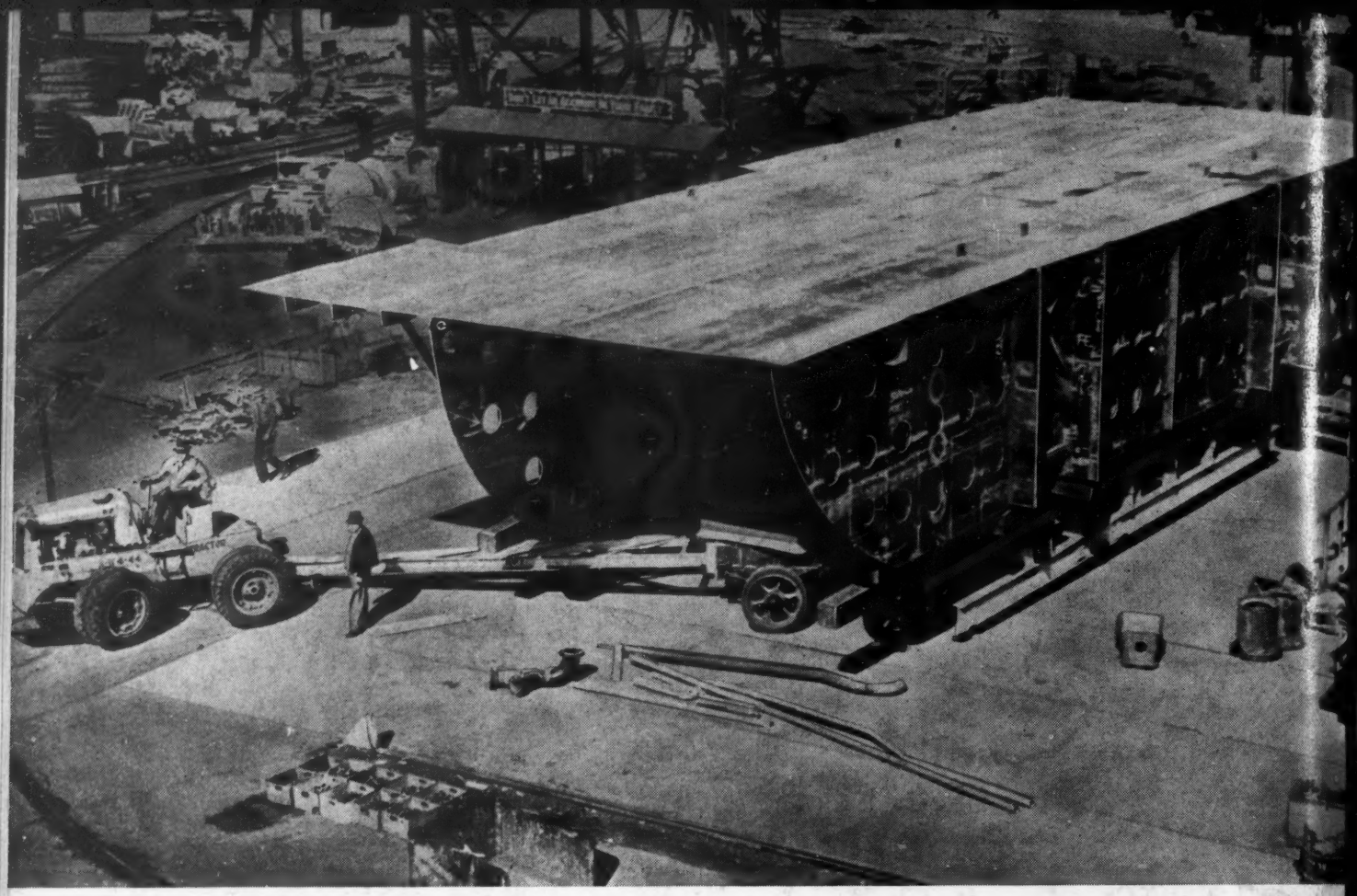

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